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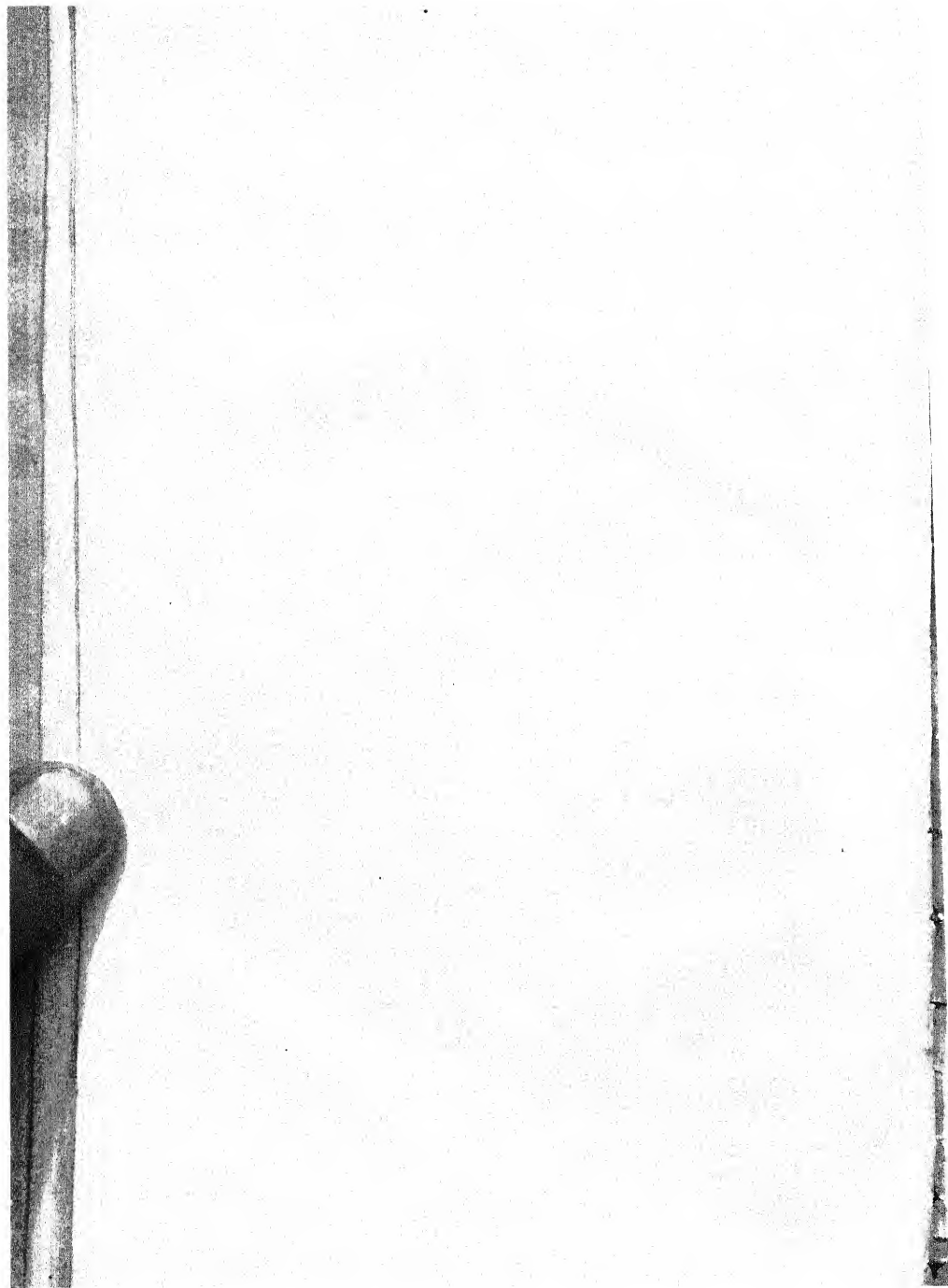
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ASIATIC SOCIETY.

Mr. Ivory's Tables of mean Astronomical refractions, revised and augmented by Major J. T. BOILEAU B. E. Superintending Magnetic Observatory Simla.

The first of these Tables was published in the Philosophical Transactions of the Royal Society for 1823, pp. 491, et seq: and a second paper and Table by the same author, appeared in the Philosophical Transactions for 1838. The mean refractions for Zenith distances under 83° correspond exactly in both the above Tables, but the refractions differ for Zenith distances between 83° and the horizon.

In Table I. of the original (of 1838) the mean refractions are given for each degree only as far as Z. D. 70° inclusive, and thence for every $10'$ to the horizon. In the accompanying Tables intermediate numbers have been obtained by interpolation to differences of the third and second order, and they have been so arranged that the tabular refractions for that part of the Table of most practical utility shall vary only between one and two seconds.

The numbers in the original Table for the last degree of Zenith distance, however, were found to give such irregular differences that the whole of the intermediate numbers between the limits of 89° and 90° have been obtained by differences to the third order, from the mean refraction for 89° i. e. $24' 26''.8$, and the horizontal refraction $34' 32''$. And although the alterations which this arrangement has

introduced are of no practical importance, the following detail of the interpolations is inserted here as a guarantee for the course which has been adopted.

TABLE I. Interpolations between numbers as in the Original Table of 1838.

TABLE II. Interpolations between Tabular refractions for $Z.D. 89^\circ$ & $Z.D. 90^\circ$

Zen. dist.	Mean refraction,	Tab. diff. M.R.	d. 1	d. 2	d. 3	Mean refraction.	Tab. diff. M.R.	d. 1	d. 2	d. 3	New No. or original
o	" "	"				" "	"				
89.00	24:16.80	...				24:26.80	...				
05	25:05.97	80	39.17	1.66		25:06.	80.1	39.2	1.7		
	*	...	40.83	1.83	+17	...	...	40.9	1.8	+1	+0.03
10	25:46.80	...	42.66	2.08	+15	25:46.9	...	42.7	1.9	+1	+0.10
15	26:29.46	87.40	44.73	1.92	-16	26:29.6	87.3	44.6	2.0	+1	+0.14
20	27:14.20	...	46.66	1.98	+06	27:14.2	...	46.6	2.0	+0	+0.00
25	28:00.86	95.30	48.64	2.10	+22	28:00.8	95.2	48.6	2.2	+2	-0.06
30	28:49.50	...	50.74	2.22	+12	28:49.4	...	50.8	2.3	+1	-0.10
35	29:40.24	103.70	52.96	1.96	-26	29:40.2	103.9	53.1	2.5	+2	-0.14
40	30:33.20	...	54.92	2.06	+10	30:33.3	...	55.6	2.6	+1	+0.19
45	31:28.12	111.90	56.98	3.22	+1.16	31:28.0	113.8	58.2	2.8	+2	+0.78
50	32:25.10	...	60.20	5.50	+2.28	32:27.1	...	61.	2.9	+1	+0.20
55	33:26.30	126.90	65.70			33:28.1	123.9	63.9			
60	34:32.00	...				34:32.	...				

The numbers to which asterisks are affixed, are those of the original Table.

With a view to facilitate the computation of numbers still intermediate between those in the present Table, Log. differences corresponding to one minute of altitude and to one second of refraction, have been given in separate columns.

The Tables (II and III of 1838) containing the Log co-efficient for Barometric pressure and for temperature, have been extended by continuing the application of the tabular differences to the limits of practical utility, and the co-efficients of the correction for altitudes under 10° have been taken from their respective columns in the original Table I. and extended by interpolation as above.

The following examples, will explain the use of the Tables.

Let P. denote the height of the Barometer.

„ T. „ the temperature, Fahrenheit.

„ T. „ the Zenith distance of the object.

Then as far as 80° of Zenith distance the log mean refraction is equal to

Log. P. From TABLE I.

+ Log. T. From TABLE II.

+ Log. Z. From TABLE III,

and to the refraction so found, must be applied the following corrections when the Zenith distance exceeds 80° vizt.

— T. (T. — 50° .)

— b. (30 in.— p.)

The values of T. and b. will be found in TABLE IV.

Example I. The observed Zenith distance of Capella being $80^\circ, 24', 09''.4$.

The height of the Barometer 29.73 and the Temperature $47.^\circ 75$. Fahrenheit required the refraction ?

Log. P. 29.73 Table, I. 9.99607

Log. T. 47.75 Table, II. 0.00214

Log. Z. $88^\circ: 20': 00$ Table, III. 3.08087

Propl. part for $04': 09''.4 = 04'.157$ 840

Nearest Tabular refraction, $20': 04''.68$ 3.08748

Log. diff. 661 $\div 36$ or Tab. diff. for $1'' = + 18.37$

T. (T.— 50°) (Table IV.) = $-.92 + -2.^\circ 25 = + 2.32$

b. (30 in. p.) (Table IV.) = $-167 +, +.27 = - 0.45$

Mean refraction, $20': 24''.92$

Example II. From the appendix to the Greenwich Transactions for 1836.

To find the refraction for Zenith distance $83^\circ. 22'$, the Barometer reading being 29.63 and Thermometer $58^\circ.1$.

Log. P. 29.63 Table, I. 9.99461

Log. T. $58.^\circ 1$ Table, II. 9.99239

Log. Z. $83^\circ 20'$ Table, III. 2.66759

Propl. part for $02'$ 190

Nearest Tabular refraction, $7': 30''.21$ 2.65641

Log. diff. 308. \div 94 or Tab. diff. for 1." =, + 03.28
 T. (T.—50°) Table IV, =, —.08 \times , + 8.1 =, —00.65
 b. (30 in. p.) ,, —.14 \times , + .37 =, —00.05

Mean refraction by the tables, .. 7': 32."79

Ditto ditto by P. Bessel's Tables, appendix, Gr. Tr. 1836, .. } 7': 31."71

Refraction by Ivory's Tables, + 1".08

When the *altitude* of the body is observed it is advisable to convert it into Zenith distance by subtraction from 90°, the proportional parts of the Logs. being then additive.

Example III. The altitude of the sun's lower limb was observed 45°: 15': 42".5, the Barometer standing at 23.33, and the Thermometer at 47.2 Fahr. required the refraction.

(90° — 45°: 15'. 42".5) = 44°: 44': 17".5. = Z.

Log. P.	23.33	Table I.	..	..	..	9.89079
Log. T.	47° 2	Table II.	..	..	..	0.00266
Log. Z.	44°: 30'	Table III.	..	..	..	1.75855
Prop. part for 14'.292	do.		..	..	..	357

Nearest Tabular number, 0': 44."80 1.65557

Log. diff. 43 \div 96 or Tab. diff. for 1" = + 0.45

Mean refraction, 0': 45."25

The following errata in the Original Table (Phil. Trans. for 1838) have been corrected.

Mean Refraction for Z.D. 89°:50' printed 32':15".10 should be 32':25".1

Log. diff. Z.D. 89°:00' and 89°:10'	.. ..	2316	.. ..	2306
86°:40' and 86°:50'	.. ..	1627	.. ..	1527
85°:40' and 85°:50'	.. ..	1312	.. ..	1308
83°:00' and 83°:10'	.. ..	833	.. ..	933

H.E.I.C. Magnetic Observatory, Simla, December, 1842.

FAHRENHEITS THERMOMETER.						BAROMETER.					
Temp.	Log.	Diff.	Temp.	Log.	Diff.	Height.	Log.	Diff.	Height.	Log.	Diff.
°	arithm.	1 deg.	°	arithm.	1 deg.	Ins.	arithm.	0.1 Inch.	Ins.	arithm.	0.1 Inch.
10	0.03952	103	70	9.98240	91	32.0	0.02803	136	26.0	9.93785	167
11	0.03849	103	71	9.98049	91	31.9	0.02667	136	25.9	9.93618	168
12	0.03746	102	72	9.97958	91	.8	0.02531	137	.8	9.93450	169
13	0.03644	102	73	9.97867	90	.7	0.02394	137	.7	9.93281	169
14	0.03542	102	74	9.97777	91	.6	0.02257	138	.6	9.93112	170
15	0.03440	102	75	9.97686	91	.5	0.02119	138	.5	9.92942	171
16	0.03338	101	76	9.97596	90	.4	0.01981	139	.4	9.92771	171
17	0.03237	101	77	9.97509	90	.3	0.01842	139	.3	9.92600	172
18	0.03136	102	78	9.97416	90	.2	0.01703	139	.2	9.92428	173
19	0.03034	101	79	9.97326	89	.1	0.01564	140	.1	9.92255	173
20	0.02933	101	80	9.97237	89	31.0	0.01424	140	25.0	9.92082	174
21	0.02832	101	81	9.97148	90	30.9	0.01284	141	24.9	9.91908	175
22	0.02730	100	82	9.97058	89	.8	0.01143	141	.8	9.91733	175
23	0.02630	100	83	9.96969	89	.7	0.01002	142	.7	9.91558	176
24	0.02531	99	84	9.96880	89	.6	0.00860	142	.6	9.91381	176
25	0.02432	100	85	9.96791	88	.5	0.00718	143	.5	9.91204	177
26	0.02332	100	86	9.96703	88	.4	0.00575	143	.4	9.91037	178
27	0.02232	99	87	9.96615	88	.3	0.00432	144	.3	9.90849	180
28	0.02133	99	88	9.96527	87	.2	0.00289	144	.2	9.90669	180
29	0.02034	99	89	9.96440	88	.1	0.00145	145	.1	9.90489	181
30	0.01935	98	90	9.96352	87	30.0	0.00000	145	24.0	9.90308	181
31	0.01837	99	91	9.96265	88	29.9	9.99855	146	23.9	9.90127	181
32	0.01738	98	92	9.96177	88	.8	9.99709	146	.8	9.89946	183
33	0.01640	99	93	9.96089	87	.7	9.99563	146	.7	9.89763	184
34	0.01541	97	94	9.96002	88	.6	9.99417	147	.6	9.89579	184
35	0.01444	98	95	9.95914	87	.5	9.99270	147	.5	9.89395	186
36	0.01346	98	96	9.95827	87	.4	9.99123	148	.4	9.89209	186
37	0.01248	97	97	9.95740	87	.3	9.98975	149	.3	9.89023	186
38	0.01151	98	98	9.95653	86	.2	9.98826	149	.2	9.88837	188
39	0.01053	96	99	9.95567	87	.1	9.98677	149	.1	9.88649	189
40	0.00957	97	100	9.95480	86	29.0	9.98628	150	23.0	9.88460	189
41	0.00861	96	101	9.95394	87	28.9	9.98378	151	22.9	9.88271	190
42	0.00764	96	102	9.95307	86	.8	9.98227	151	.8	9.88081	191
43	0.00668	96	103	9.95220	86	.7	9.98076	152	.7	9.87890	191
44	0.00572	96	104	9.95135	85	.6	9.97924	152	.6	9.87699	193
45	0.00476	96	105	9.95050	85	.5	9.97772	152	.5	9.87506	193
46	0.00380	95	106	9.94965	85	.4	9.97620	153	.4	9.87313	195
47	0.00285	95	107	9.94880	86	.3	9.97467	153	.3	9.87118	196
48	0.00190	96	108	9.94794	85	.2	9.97313	154	.2	9.86923	197
49	0.00094	94	109	9.94709	84	.1	9.97159	155	.1	9.86727	197
50	0.00000	94	110	9.94625	85	28.0	9.97004	156	22.0	9.86530	198
51	9.99906	95	111	9.94540	85	27.9	9.96848	156	21.9	9.86332	198
52	9.99811	94	112	9.94455	84	.8	9.96692	156	.8	9.86134	200
53	9.99717	94	113	9.94371	84	.7	9.96536	157	.7	9.85934	201
54	9.99623	94	114	9.94287	84	.6	9.96379	158	.6	9.85733	201
55	9.99529	95	115	9.94203	84	.5	9.96221	158	.5	9.85532	203
56	9.99434	93	116	9.94119	84	.4	9.96063	159	.4	9.85329	203
57	9.99341	93	117	9.94035	84	.3	9.95904	159	.3	9.85126	205
58	9.99248	94	118	9.93951	83	.2	9.95745	160	.2	9.84921	205
59	9.99154	93	119	9.93868	83	.1	9.95585	161	.1	9.84716	206
60	9.99061	92	120	9.93785	84	27.0	9.95424	161	21.0	9.84510	207
61	9.98969	92	121	9.93701	83	26.9	9.95263	162	20.9	9.84303	209
62	9.98875	92	122	9.93618	83	.8	9.95101	162	.8	9.84094	209
63	9.98783	93	123	9.93535	83	.7	9.94939	163	.7	9.83885	310
64	9.98690	93	124	9.93452	82	.6	9.94776	163	.6	9.83675	212
65	9.98598	92	125	9.93370	82	.5	9.94612	164	.5	9.83463	212
66	9.98506	92	126	9.93288	82	.4	9.94448	164	.4	9.83251	214
67	9.98414	91	127	9.93205	82	.3	9.94283	165	.3	9.83037	214
68	9.98323	92	128	9.93120	82	.2	9.94118	166	.2	9.82883	216
69	9.98231	91	129	9.93041	83	.1	9.93952	167	.1	9.82607	216
70	9.98140	130	130	9.92958		26.0	9.93785		20.0	9.82391	

Alt.	Zen. dist.	Mean Refraction.	Log. Z.	Log. diff. for		Alt.	Zen. dist.	Mean Refraction.	Log. Z.	Log. diff. for	
				1' of ZD.	1" of Refn.					1' of ZD.	1" of Refn.
90.00	00.00	00.00.00	0.0000			46.00	44.00	00.56.35	1.75100		
89	01	01.02	0.0085			45.30	44.30	57.35	1.75855	25	755
88	02	02.04	0.3097	50	2953	45	45	58.36	1.76611	25	741
87	03	03.06	0.4860	29	1728	44.30	45.30	59.39	1.77367	25	734
86	04	04.08	0.6112	21	1227	44	46	01.00.43	1.78123	25	727
85	05	05.11	0.7086	16	955	43.30	46.30	01.49	1.78880	25	714
84	06	00.06.14	0.7892	12	773	43	47	02.57	1.79637	25	701
83	07	07.17	0.8557	11	656	42.30	47.30	03.67	1.80396	25	690
82	08	08.21	0.9144	10	570	42	48	01.04.80	1.81155	25	672
81	09	09.25	0.9663	9	500	45	48.15	05.37	1.81535	25	667
80	10	10.30	1.0129	8	448	30	30	05.94	1.81915	25	667
79	11	11.35	1.0553	7	404	15	45	06.52	1.82296	25	657
78	12	00.12.42	1.0941	7	366	41.00	49.00	01.07.11	1.82678	25	648
77	13	13.49	1.1300	6	356	45	15	07.70	1.82060	25	648
76	14	14.56	1.1634	6	309	30	30	08.30	1.83442	25	637
75	15	15.66	1.1947	5	287	15	45	08.91	1.83825	26	628
74	16	16.75	1.2241	5	267	40.00	50.00	01.09.52	1.84208	26	628
73	17	17.86	1.2519	5	250	45	15	10.13	1.84592	26	624
72	18	00.18.98	1.2784	4	237	30	30	10.75	1.84976	26	624
71	19	20.11	1.3036	4	233	15	45	11.38	1.85361	26	611
70	20	21.26	1.3277	4	210	39.00	51.00	01.12.02	1.85747	26	604
69	21	22.42	1.3507	4	199	45	15	12.66	1.86134	26	604
68	22	23.60	1.3729	4	188	30	30	13.31	1.86521	26	595
67	23	24.80	1.3944	4	179	15	45	13.97	1.86909	26	588
66	24	00.26.01	1.4151	3	171	38.00	52.00	01.14.64	1.87298	26	581
65	25	27.24	1.4352	3	163	45	15	15.31	1.87688	26	581
64	26	28.49	1.4547	3	156	30	30	15.99	1.88079	26	575
63	27	29.76	1.4736	3	149	15	45	16.68	1.88461	26	568
62	28	31.05	1.4921	3	143	37.00	53.00	01.17.38	1.88863	26	561
61.30	28.30	31.71	1.5012	3	135	45	15	18.08	1.89256	26	561
61	29	00.32.38	1.5102	3	134	30	30	18.80	1.89650	26	555
60.30	29.30	33.05	1.5191	3	133	15	45	19.51	1.90044	26	547
60	30	33.72	1.5279	3	131	36.00	54.00	01.20.24	1.90440	26	542
59.30	30.30	34.40	1.5366	3	128	45	15	20.98	1.90838	27	535
59	31	35.09	1.5452	3	125	30	30	21.73	1.91237	27	531
58.30	31.30	35.79	1.5537	3	121	15	45	22.48	1.91637	27	525
58	32	00.36.49	1.5632	3	121	35.00	55.00	01.23.25	1.92038	27	520
57.30	32.30	37.20	1.5706	3	118	45	15	24.03	1.92440	27	515
57	33	37.93	1.5790	3	117	30	30	24.81	1.92843	27	517
56.30	33.30	38.66	1.5873	3	114	15	45	25.60	1.93247	27	511
56	34	39.39	1.5955	3	112	34.00	56.00	01.26.41	1.93653	27	501
55.30	34.30	00.40.14	1.6036	3	108	45	15	27.22	1.94060	27	503
55	35	40.89	1.6116	3	107	30	30	28.04	1.94469	27	499
54.30	35.30	41.65	1.6196	3	105	15	45	28.38	1.94879	27	488
54	36	42.42	1.6276	3	104	33.00	57.00	01.29.73	1.95291	27	485
53.30	36.30	43.21	1.6356	3	100	45	15	30.59	1.95704	28	480
53	37	44.10	1.6435	3	100	30	30	31.46	1.96129	28	477
52.30	37.30	44.80	1.6513	3	99	15	45	32.34	1.96536	28	474
52	38	00.45.61	1.6591	3	96	32.00	58.00	01.33.22	1.96955	28	471
51.30	38.30	46.43	1.6668	3	95	45	15	34.14	1.97375	28	462
51	39	47.27	1.6746	3	93	30	30	35.06	1.97797	28	460
50.30	39.30	48.12	1.6823	3	91	15	45	35.99	1.98221	28	456
50	40	48.99	1.6901	3	89	31.00	59.00	01.36.93	1.98646	28	452
49.30	40.30	49.87	1.6978	3	88	45	15	37.89	1.99073	29	445
49	41	00.50.76	1.7055	3	87	30	30	38.86	1.99502	29	442
48.30	41.30	51.66	1.7131	3	86	15	45	39.85	1.99934	29	436
48	42	52.47	1.7204	3	84	30.00	60.00	01.40.85	2.00368	29	434
47.30	42.30	53.49	1.7283	3	83	45	15	41.86	2.00804	29	432
47	43	54.43	1.7358	3	81	30	30	42.89	2.01242	29	425
46.30	43.30	55.38	1.7434	3	80	15	45	43.94	2.01682	29	419
46	44	00.56.35	1.7510	3	78	29.00	61.00	01.45.01	2.02124	29	413

(TABLE III.)

Ivory's mean Astronomical Refractions.

Alt.	Zen. dist.	Mean Refract.	Logarithm. Z.	Log. diff. for		Alt.	Zen. dist.	Mean Refract.	Logarithm. Z.	Log. diff. for	
				1' of Z. D.	1' of Refn.					1' of Z. D.	1' of Refn.
° /	° /	' "				° /	° /	° "			
29.00	61.00	1.45.01	2.02124			20.00	70.00	2.19.36	2.20185		
50	10	45.73	2.02420	30	412	55	05	39.87	2.20379	39	271
40	20	46.45	2.02717	30	411	50	10	40.59	2.20573	39	271
30	30	47.19	2.03015	30	404	45	15	41.31	2.20768	39	271
20	40	47.93	2.03315	30	404	40	20	42.04	2.20963	39	271
10	50	48.68	2.03616	30	401	35	25	42.78	2.21159	39	266
28.00	62.00	1.49.44	2.03918	30	398	30	30	2.43.52	2.21356	39	266
50	10	50.20	2.04221	30	398	25	35	44.26	2.21551	40	265
40	20	50.97	2.04526	31	396	20	40	45.01	2.21752	40	265
30	30	51.76	2.04832	31	387	15	45	45.77	2.21951	40	262
20	40	52.55	2.05138	31	387	10	50	46.53	2.22150	40	262
10	50	53.35	2.05446	31	385	05	55	47.30	2.22351	40	261
27.00	63.00	1.54.17	2.05755	31	377	19.00	71.00	2.48.08	2.22552	40	259
50	10	54.99	2.06065	31	377	55	05	48.86	2.22754	40	258
40	20	55.82	2.06377	31	377	50	10	49.65	2.22956	40	256
30	30	56.65	2.06690	31	374	45	15	50.45	2.23159	41	254
20	40	57.50	2.07004	31	373	40	20	51.25	2.23363	41	254
10	50	58.35	2.07319	32	371	35	25	52.06	2.23568	41	253
26.00	64.00	1.59.22	2.07635	32	363	30	30	2.52.87	2.23773	41	253
50	10	2.00.10	2.07954	32	363	25	35	53.70	2.23979	41	349
40	20	00.99	2.08274	32	360	20	40	54.53	2.24186	41	249
30	30	01.89	2.08595	32	357	15	45	55.37	2.24394	42	248
20	40	02.80	2.08918	32	355	10	50	56.21	2.24603	42	248
10	50	03.72	2.09242	32	352	05	55	57.06	2.24812	42	246
25.00	65.00	2.04.65	2.09567	33	350	18.00	72.00	2.57.92	2.25022	42	244
50	10	05.59	2.09894	33	348	55	05	58.79	2.25233	42	243
40	20	06.54	2.10223	33	346	50	10	59.66	2.25445	42	243
30	30	07.51	2.10553	33	340	45	15	3.00.54	2.25657	42	241
20	40	08.49	2.10885	33	339	40	20	01.43	2.25870	43	239
10	50	09.48	2.11219	33	337	35	25	02.33	2.26084	43	238
24.00	66.00	2.10.48	2.11555	34	336	30	30	3.03.23	2.26299	43	238
50	10	11.50	2.11892	34	330	25	35	04.14	2.26515	43	237
40	20	12.53	2.12230	34	328	20	40	05.06	2.26732	43	236
30	30	13.57	2.12570	34	427	15	45	05.99	2.26950	44	234
20	40	14.62	2.12912	34	326	10	50	06.93	2.27168	44	233
10	50	15.69	2.13256	34	322	05	55	07.87	2.27388	44	233
23.00	67.00	2.16.78	2.13602	35	317	17.00	73.00	3.08.83	2.27608	44	228
50	10	17.88	2.13950	35	316	55	05	09.80	2.27829	44	228
40	20	18.99	2.14300	35	315	50	10	10.77	2.28051	44	227
30	30	20.12	2.14652	35	312	45	15	11.75	2.28274	45	227
20	40	21.27	2.15006	35	308	40	20	12.74	2.28498	45	225
10	50	22.43	2.15362	36	307	35	25	13.74	2.28723	45	225
22.00	68.00	2.23.61	2.15720	36	303	30	30	3.14.75	2.28948	45	223
50	10	24.81	2.16080	36	300	25	35	15.77	2.29174	45	222
40	20	26.03	2.16442	36	297	20	40	16.80	2.29402	46	221
30	30	27.26	2.16806	36	296	15	45	17.83	2.29631	46	220
20	40	28.50	2.17172	37	295	10	50	18.88	2.29860	46	220
10	50	29.76	2.17540	37	292	05	55	19.94	2.30091	46	218
21.00	69.00	2.31.64	2.17911	37	290	16.00	74.00	3.21.01	2.30323	46	217
55	05	31.69	2.18097	37	287	55	05	22.09	2.30556	47	216
50	10	32.34	2.18284	37	287	50	10	23.18	2.30789	47	214
45	15	33.00	2.18471	38	284	45	15	24.28	2.31023	47	213
40	20	33.66	2.18659	38	284	40	20	25.39	2.31259	47	213
35	25	34.33	2.18847	38	281	35	25	26.52	2.31496	47	212
30	30	2.35.00	2.19036	38	281	30	30	3.27.65	2.31734	48	210
25	35	35.68	2.19226	38	279	25	35	28.79	2.31973	48	208
20	40	36.36	2.19416	38	279	20	40	29.95	2.32213	48	207
15	45	37.05	2.19607	38	277	15	45	31.12	2.32454	48	206
10	50	37.75	2.19794	38	275	10	50	32.30	2.32696	48	205
05	55	38.45	2.19992	39	275	05	55	33.49	2.33039	49	204
20.00	70.00	2.39.16	2.20185	39	272	15.00	75.00	3.34.70	2.33184	49	203

Alt.	Zen. dist.	Mean Refract.	Logarithm. Z.	Log. diff. for		Alt.	Zen. dist.	Mean Refract.	Logarithm. Z.	Log diff. for	
				1' of Z. D.	1'' of Refn.					1' of Z. D.	1'' of Refn.
15.00	75.00	3 34.70	2 33104			10.00	80.00	5.20.19	2.50541		
55	05	35.92	2.33480	49	202	55	05	22.76	2.50887	69	135
50	10	37.15	2.33677	49	201	50	10	25.36	2.51237	70	134
45	15	38.39	2.33925	50	200	45	15	28.01	2.51589	70	133
40	20	39.65	2.34174	50	197	40	20	30.70	2.51943	71	132
35	25	40.93	2.34424	50	197	35	25	33.43	2.52300	71	131
30	30	42.21	2.34676	50	196	30	30	36.20	2.52660	72	131
25	35	43.52	2.34929	51	196	25	35	39.02	2.53020	72	128
20	40	44.82	2.35183	51	195	20	40	41.88	2.03387	73	128
15	45	46.14	2.35438	51	193	15	45	44.19	2.53755	74	127
10	50	47.48	2.35695	51	192	10	50	47.74	2.54125	74	125
05	55	48.84	2.35953	52	190	05	55	50.74	2.54498	75	124
14.00	76.00	3.50.21	2.26212	52	129	09.00	81.00	5.53.79	2.54874	75	123
55	05	51.60	2.36473	52	188	55	05	56.89	2.55253	76	122
50	10	53.00	2.36735	52	187	50	10	6.00.04	2.55635	76	121
45	15	54.42	2.36998	53	185	45	15	03.24	2.56019	77	120
40	20	55.85	2.37263	53	185	40	20	06.50	2.56409	78	119
35	25	57.30	2.37529	53	183	35	25	09.81	2.56798	78	118
30	30	58.76	2.37796	53	183	30	30	6.13.18	2.57192	79	117
25	35	60.24	2.38064	54	181	25	35	16.61	2.57589	79	116
20	40	61.74	2.38334	54	180	20	40	20.09	2.57989	80	115
15	45	63.26	2.38606	54	179	15	45	23.64	2.58393	81	114
10	50	64.79	2.38879	55	178	10	50	27.26	2.58800	81	112
05	55	66.34	2.39154	55	177	05	55	30.94	2.59210	82	111
13.00	77.00	4.07.91	2.39430	55	176	08.00	82.00	6.34.68	2.59624	83	111
55	05	09.50	2.39708	56	175	55	05	38.49	2.60041	83	109
50	10	11.11	2.39987	56	173	50	10	42.37	2.60462	84	109
45	15	12.74	2.40268	56	172	45	15	46.31	2.60886	85	108
40	20	14.39	2.40550	56	171	40	20	50.33	2.61313	85	106
35	25	16.06	2.40834	57	171	35	25	54.42	2.61774	86	105
30	30	17.75	2.41119	57	169	30	30	6.58.59	2.62179	87	104
25	35	19.46	2.41406	57	168	25	35	7.02.85	2.62618	88	103
20	40	21.19	2.41695	58	167	20	40	07.19	2.63062	89	102
15	45	22.95	2.41986	58	165	15	45	11.62	2.63509	89	101
10	50	24.72	2.42278	58	165	10	50	16.13	2.63961	90	100
05	55	26.51	2.42572	59	164	05	55	20.73	2.64417	91	99
12.00	78.00	4.28.33	2.42867	59	162	07.00	83.00	7.25.42	2.64877	92	98
55	05	30.17	2.43164	59	161	55	05	30.21	2.65341	93	97
50	10	32.04	2.43464	60	160	50	10	35.09	2.65809	94	96
45	15	33.93	2.43764	60	159	45	15	40.07	2.66282	95	95
40	20	35.84	2.44066	60	158	40	20	45.15	2.66759	95	94
35	25	37.78	2.44370	61	157	35	25	50.34	2.67241	96	93
30	30	39.75	2.44677	61	156	30	30	7.55.64	2.67727	97	92
25	35	41.74	2.44985	62	155	25	35	8.01.04	2.68218	98	91
20	40	43.76	2.45295	62	153	20	40	06.55	2.68713	99	90
15	45	45.81	2.45608	63	153	15	45	12.19	2.69213	100	89
10	50	47.89	2.45902	63	151	10	50	17.95	2.69718	101	88
05	55	49.99	2.46238	63	151	05	55	23.84	2.70229	102	87
11.00	79.00	4.52.12	2.46556	64	149	05.00	84.00	8.29.86	2.70746	103	86
55	05	54.28	2.46876	64	148	55	05	36.02	2.71267	104	85
50	10	56.47	2.47198	64	147	50	10	42.31	2.71793	105	84
45	15	58.69	2.47552	65	146	45	15	48.75	2.72225	106	83
40	20	5.00.91	2.47848	65	145	40	20	55.33	2.72862	107	81
35	25	03.22	2.48176	66	144	35	25	9.02.04	2.73405	109	81
30	30	05.54	2.48507	66	143	30	30	08.96	2.73954	110	79
25	35	07.89	2.48840	67	142	25	35	16.03	2.74509	111	79
20	40	10.28	2.49175	67	140	20	40	23.25	2.75070	112	78
15	45	12.70	2.49513	68	140	15	45	30.65	2.75637	113	77
10	50	15.66	2.49853	68	138	10	50	38.23	2.76210	115	76
05	55	17.66	2.50196	69	137	05	55	46.00	2.76970	116	75
10.00	80.00	5.20.19	2.50541	69	136	05.30	85.00	9.53.96	2.77376	117	74

Alt.	Zen. dist.	Mean. Refract.	Loga- rithm. Z.	Log. diff. for		Alt.	Zen. dist.	Thermometer		Barometer.	
				1' of Z. D.	1'' of Refn.			T.	diff. for 1' Z. D.	B.	diff. for 1' Z. D.
05.00	85.00	9.53.96	2.77376			10.00	80.00	.03			
55	05	10.02.13	2.77969	119	73	09.00	81.00	.04			.04
50	10	10.52	2.78569	120	72	08.00	82.00	.05			.05
45	15	19.11	2.79176	121	71	30	82.30	.06			.08
40	20	27.90	2.79789	123	70	07.00	83.00	.07	.001		.10
35	25	36.93	2.80409	124	69	45	83.15	.08			.11
30	30	46.21	2.81037	126	68	30	30	.09			.12
25	35	10.55.75	2.81673	127	67	15	45	.09			.14
20	40	11.05.55	2.82316	128	66	06.00	84.00	.10			.15
15	45	15.60	2.82967	130	65	45	15	.11			.16
10	50	25.90	2.83626	132	61	30	30	.12			.18
05	55	36.31	2.84293	133	63	01.45	45	.13			.20
04.00	86.00	11.47.43	2.84968	136	62	05.00	85.00	.15	.002		.22
55	05	58.66	2.85552	137	61	50	10	.17			.24
50	10	12.10.21	2.86345	139	60	40	20	.18			.27
45	15	22.10	2.87046	140	59	30	30	.20			.29
40	20	34.34	2.87757	142	58	30	40	.21			.32
35	25	46.94	2.88476	144	57	20	50	.23	.002		.34
30	30	12.59.92	2.89205	146	56	04.00	86.00	.24	.003		.37
25	35	13.13.31	2.89944	148	55	50	10	.26			.39
20	40	27.11	2.90693	150	54	40	20	.29			.43
15	45	41.34	2.91462	152	53	30	30	.31			.47
10	50	55.99	2.92220	154	52	20	40	.34			.51
05	55	14.11.13	2.92999	156	51	10	50	.36			.57
03.00	87.00	26.76	2.93790	158	51	03.00	87.00	.39	.004		.62
55	05	42.90	2.94591	160	50	55	05	.41			.67
50	10	59.54	2.95402	162	49	50	10	.43			.71
45	15	15.16.75	2.96225	165	48	45	15	.45			.75
40	20	34.55	2.97060	167	47	40	20	.47	.005		.79
35	25	52.93	2.97906	169	46	35	25	.50			.83
30	30	16.11.95	2.98764	172	45	30	30	.52			.87
25	35	31.64	2.99635	174	44	25	35	.55			.91
20	40	52.03	3.00519	177	43	20	40	.58			.96
15	45	17.13.16	3.01417	180	43	15	45	.61			1.01
10	50	35.06	3.02329	182	42	10	50	.63	.006		1.07
05	55	57.77	3.03254	185	41	05	55	.66			1.13
02.00	88.00	18.21.33	3.04192	188	40	02.00	88.00	.69			1.19
55	05	18.45.76	3.05144	190	39	55	05	.74			1.24
50	10	19.11.07	3.06110	193	38	50	10	.78			1.32
45	15	19.37.35	3.07091	196	37	45	15	.83			1.41
40	20	20.04.68	3.08087	200	36	40	20	.87			1.50
35	25	20.33.09	3.09099	202	36	35	25	.92			1.58
30	30	21.02.60	3.10127	206	35	30	30	.96	.011		1.67
25	35	21.33.28	3.11170	209	34	25	35	1.02			1.75
20	40	22.05.22	3.12229	212	33	20	40	1.07	.012		1.87
15	45	22.38.47	3.13305	215	32	15	45	1.13			2.00
10	50	23.13.11	3.14398	219	32	10	50	1.19	.013		2.12
05	55	23.49.2	3.15509	222	31	05	55	1.26			2.24
01.00	89.00	24.26.8	3.16637	226	30	01.00	89.00	1.32	.028		2.36
55	05	25.06	3.17783	229	29	55	05	1.42			2.48
50	10	25.46.9	3.18947	233	28	50	10	1.52			2.70
45	15	26.29.6	3.20130	237	27	45	15	1.62			2.91
40	20	27.14.2	3.21381	240	27	40	20	1.72			3.13
35	25	28.00.8	3.22551	244	26	35	25	1.82			3.34
30	30	28.49.4	3.23789	248	25	30	30	1.92			3.56
25	35	29.40.2	3.25046	251	25	25	35	2.06			3.77
20	40	30.33.3	3.26323	255	24	20	40	2.20			4.05
15	45	31.28.9	3.27620	259	23	15	45	2.34			4.34
10	50	32.27.1	3.28938	264	23	10	50	2.48	.026		4.67
05	55	33.28.1	3.30278	268	22	05	55				5.00
00.00	90.00	34.32	3.31639	272	21	00.00	90.00				

AN ELEVENTH *Memoir on the Law of Storms in India, being the Storms in the Bay of Bengal and Southern Indian Ocean, from 26th November to 2d December, 1843.* By HENRY PIDDINGTON; with a Chart.

In this memoir, for much of the material of which I am as usual indebted to the zealous exertions of Capt. Biden, Master Attendant of Madras, we have the advantage of tracing at the same time storms raging on the North and South sides of the Equator, of having a register of the weather almost upon the Equator while the storms were blowing on both sides, and finally of tracing with abundant data in the dangerous "Storm track" (as I have called it in another publication),* extending from 5° to 15' South and from 75° to 90' E. a most severe hurricane, and this investigation has moreover developed a new feature in these storms, viz. that there are some which are comparatively *stationary*! having but an exceedingly slow progressive motion; and should this be found by future research to prevail frequently, it will be of importance both in our theoretical and practical views of storms. It will be found in the postscript to the Memoir that after this was sent to the press I obtained from the Mauritius, the details of a storm there, in which a vessel, the Charles Heddle, was fully proving for us by what I may call a beautiful experiment, the truth of our researches here!

I have as usual first given the documents carefully abridged, then a Tabular view of them for each hemisphere, a summary of the grounds from which the positions of the centres of the storms on different days are developed, and finally a few remarks on the whole.

Copy of Report kept at the Master Attendant's Office Madras, from
Captain BIDEN.

Barometer.

8 A. M. 4 P. M. 10 P. M.

30th November 1843.—6 A. M. North West wind, North current strong and high surf.	7 A. M. North West wind, current very strong, high, and irregular surf, ..	30.012	29.925	29.997
1st December 1843.—6. A. M. North West wind, North current, strong, high and irregular surf no boats or Catamarans could cross the surf.	Rain,	29.984	29.877	29.953

* Horn Book of Storms p.—.

Barometer.

8 A. M. 4 P. M. 10 P. M.

<i>2d December 1843.</i> —6 A. M. North West wind, North current, strong irregular and high surf, cloudy,			
	29.944	29.861	29.916
<i>Ditto.</i> —5-30, P. M. North wind, North current, strong and very high surf, no boats or Cattamarans could cross the surf. Raining,			
<i>3d December 1843.</i> —4-55, A. M. North East wind, North current and high surf; cloudy weather,			
	29.956	29.893	29.986
<i>Ditto.</i> —3-15, P. M. South East wind, South current, high surf and rain,			
<i>Ditto.</i> —6 P. M. South East wind, South current and rain,			
<i>4th December 1843.</i> —5 A. M. East wind, South current, high and irregular surf; drizzling rain,			
	30.008	29.912	29.988
<i>Ditto.</i> —10-30, A. M. East wind, South current strong, and moderate surf,			
(Signed)			CHARLES BIDEN.

Abridged Log of the Ship VERNON, Captain J. GIMBLETT, from Madras to Calcutta, reduced to civil time.

The Vernon left Madras roads, on the 30th November 1843, at 7. P. M. and stood to the East, with a fresh monsoon from N.N.E. till midnight.

1st December.—A. M. strong breeze N. N. E. till noon when Lat. $12^{\circ} 5' N.$, Long. Chro. $83^{\circ} 29'$, E., Bar. 29.68., Symp. 29.52.; P. M. fresh gales to midnight with the wind veering at 9 P. M. to N. E. and at midnight to E. N. E.

2d December.—A. M. heavy squalls; at 2 wind shifted to E. S. E. with confused sea and much lightning, Bar. 29.54. 9 A. M. wind E. by S. moderating a little; noon squally and heavy sea Lat. D. R. $11^{\circ} 48' N.$ Long. D. R. $83^{\circ} 38'$, Bar. 29.69., Symp. 29.54. Ther. 81° P. M. strong gale Easterly, moderating to fine, at 7 P. M. when wind at E. N. E.

Tabular Memorandum of the state of the Weather as observed during a Passage from Calcutta towards the Mauritius with latitude and longitude, state of the Thermometer, both air and water every day at Noon, Moon's age &c. Together with the force and Direction of the Winds and state of the Weather, immediately preceding as well as during and after the various gales. By Capt. WEBB, Ship WINTERED.

Part of the world.	Date in nautical time.	Hour.	Latitude & Longitude at Noon.	Moon's age.	Height of Bar.	Ther. air water.	Explanatory and General Remarks.
Bay of Bengal, ... gal, ...	1843. Nov. 24th,	Noon, ... 8 P. M. ... 4 A. M. ...	15° 27' N. 87° 10' E. ..... .....	..... ..... .....	29 83 ... 83 ... 83	78 79	Fine clear weather and smooth water.
	Nov. 25th,	Noon, ... 8 P. M. ... 4 A. M. ...	12° 43' N. 86° 25' E. ..... .....	..... ..... .....	29 82 ... 81 ... 81	78½	Fresh breezes and cloudy weather.
	Nov. 26th,	Noon, ... 8 P. M. ... 4 A. M. ...	9° 40' N. 85° 48' E. ..... .....	..... ..... .....	... 80 ... 81 ... 80	78	From 4 A. M. to noon. Dark gloomy and wild appearance.
		8 P. M. ...	.....	.....	... 76	...	At 9 P. M. strong squalls and heavy rain, took in and made sail accordingly; passed the ship Hoogly of London.
Indian Ocean, ...	Nov. 27th,	4 A. M. ... Noon, ...	7° 4' N.	85° 56' E. .....	... 72 ... 67	78½	Sudden dangerous gusts and violent squalls, with very little warning from their first appearance above the horizon; heavy rain attending the squalls.
	Nov. 28th,	8 P. M. ... 4 A. M. ... Noon, ...	..... ..... 4° 27' N.	..... ..... 85° 58' E.	67 ... 58 ... 65	...	Strong gales, short confused sea, ship labouring much; at 11 P. M. most terrific squalls accompanied with torrents of rain, dark dismal weather, reduced sail to double reef top-sail.
	"	8 P. M. ...	.....	.....	... 60	...	Succession of dangerous squalls and thick weather.
	Nov. 29th,	4 A. M. ... Noon, ... 8 P. M. ... 4 A. M. ...	..... 1° 20' N. ..... .....	..... 86° 30' E.	29 57 ... 59 ... 66 ... 65	81	Observed the most severe squalls these last three days to commence with drizzling small rain after which (generally) follows torrents of rain, accompanied with most violent and terrific squalls. A ship must be well prepared to meet them, to save the canvas and spars from destruction; Barometer rising and falling during the squalls and rain, so that no dependence could be placed upon it, varying at times in an hour, from 29.74, to 29.57, &c.
South Lat., ...	Nov. 30th,	Noon, ... 8 P. M. ... 4 A. M. ...	1° 1' S.	86° 0' E.	64 ... 68 ... 74	83½	
	Dec. 1st,	Noon, ... 8 P. M. ... 4 A. M. ...	3° 15' S.	86° 56' E.	67 ... 68 ... 68	82½	
		8 P. M. ...	.....	.....	... 63	...	
	Dec. 2d,	Noon, ...	4° 21' S. 87° 34' E.	.....	... 74	83	

*Report of the Barque NIAGARA Capt. W. CHAMPION, forwarded by
Captain BIDEN.*

Friday 1st December 1843.—Lat. 10° N., Long. 87° E., experienced a hard gale from S. W. to E. S. E. with a tremendous high sea on; lost sails and sustained other damage, strong gales from Eastward on Saturday the 2d. On approaching the coast, found the weather more moderate and a smoother sea; during the above days it rained incessantly, and the Bar. fell to 29.10, Ther. $78^{\circ} 40'$.

*Abridged Log of the Ship CANDAHAR, Capt. W. RIDLEY, from the
Mauritius bound to Calcutta; reduced to civil time.*

26th Nov. 1842.—Wind variable from N. N. E., N. b. E., and N. E. b. N., Course North 54° W. $94'$, Lat. account $8^{\circ} 19'$ N., Long. $84^{\circ} 38'$ E., heavy squalls Bar. 29.80.

27th November.—To noon cloudy, wind N. E., strong wind till midnight when N. E. b. E., Lat. noon $9^{\circ} 5'$ N., Long. $83^{\circ} 50'$, Sunset heavy squalls, Bar. not marked.

28th November.—Strong Monsoon N. E. b. E. 2 A. M. veering to Northward 11 A. M. Violent squall; noon heavy weather, Lat. account $9^{\circ} 15'$ N., Long. E. $83^{\circ} 45'$, heavy squalls and strong monsoon till midnight. Bar. 29.70.

29th November.—Heavy breeze N. b. E. with squalls, noon every appearance of a storm, Lat. $9^{\circ} 26'$ N., Long. $83^{\circ} 48'$ E. 4 P. M. rapidly increasing. At 6 wind North; laid to, heavy squalls and rain, Bar. 29.7.

30th November.—Heavy gales, and tremendous squalls. Wind 1 A. M. N. W. by N. Lat. $9^{\circ} 40'$, North, Long. $83^{\circ} 57'$ E. 11 A. M. terrific squall of wind and rain. Bar. 29.50. P. M. heavy gale N. W. to midnight.

1st December.—A. M. heavy gale N. W. with terrific squalls. At 2 A. M. wind N. b. E. 8 A. M. N. W. b. W. Noon, to 3 P. M. very little wind, Lat. $10^{\circ} 32'$ North, Long. $84^{\circ} 3'$ E. At 3 P. M. wind shifted to S. W., Bar. fell to 29.40., 5 P. M. shifted again to N. W., 9 P. M. set fore-sail; at 10 wind veered again to S. W., midnight, gale appearing steady, shook out close reefs, steering North.

N. B.—From 11 A. M. to midnight steering North 4' per hour. At 11 and 12, 4½ per hour.

2nd December.—1 A. M. gale suddenly increased to a most violent storm S. W., hove to under try-sails; 4 A. M. South. 5 to 6 raging with increased fury, Bar. 29.40, 8 A. M. more moderate, bore up steering North 6 miles. At 10 wind South. Noon Lat. account 11° 10' North, Long. 84° 04' E., Bar. A. M. 29.60, 2 P. M. steering N. N. W. wind S. S. E. at 4 N. W. by N. wind S. E. 11 P. M. passed a ship, steering to the S. W. midnight. Bar. 29.80.

3rd December.—A. M. Strong breeze S. E. day-light steady, noon Lat. Obs. 12° 31', Long. 84° 7', fine weather.

Abridged Log of the Ship FAZZULBARRY, Capt. H. HANDLEY from Bombay bound to Calcutta, reduced to civil time.

27th November. 1843.—At noon moderate breeze from E. S. E. but threatening looking weather to the Eastward. Lat. 5° 38' N., Long. Chr. 88° 40', Bar. 29.72, and falling, Ther. 82°. For the last two days, current 110 miles to the Westward. Remark by Capt. Handley, at the beginning of this log. "Observed many thick white clouds densely packed to the Eastward which I have always found to precede an Easterly gale."

P. M. Strong breezes Easterly (and at 8 P. M. E. N. E.) dark cloudy weather and very threatening appearance to the Eastward with heavy N. E. sea on, increasing to a strong gale with dark threatening weather and heavy sea; Bar. 29.65.

28th November.—6 A. M. Wind N. E. Noon strong gale with dark threatening weather to the N. E. making all preparation for a gale. Lat. 7° 22' N., Long. Chro. 88.10., Bar. 29.54, Ther. 81.0. P. M. Wind E. N. E. heavy gale with thick dark weather. 3h.30 P. M. saw the "John Brightman," steering to the Southward. Midnight gale increasing, Bar. 29.45.

29th November.—A. M. gale blowing most furiously, saw a ship running to the Southward. 10 wind N. E. b. E. marked at noon N. E. Bar. 29.14, Ther. 83° No observation, Long. 87° 20'. P. M. furious gale N. N. E. Bar. 29.40. At 11.30 ship in distress and Arab crew

alarmed. Wind at North, bore up at midnight running S. E. and at 3 A. M. on 30th. S. S. E.

30th November.—Running to the S. S. E. $6\frac{1}{2}$ knots. 3 A. M. gale at the greatest fury “blowing so hard that it was scarcely possible to hold on;” at 8, a little more moderate; noon moderating fast, but Barometer running low 29.40, Ther. 82° , Lat. indifferent Obs. $7^{\circ} 22' N.$, Long. $87^{\circ} 35' E.$, having since midnight made 74 miles to the S. S. E. and South. 8 P. M. wind N. N. E., course S. E. 5' per hour; winds marked as variable N. N. E. to S. W. at 7 P. M. when (from 5 P. M. ship had only been going 1.4 knots) remarks are “variable dark cloudy weather and a high cross sea; easterly gale broken, but Barometer very low, 29.31. At 7 P. M. “a heavy Westerly sea rolling up and overpowering the Easterly sea” run from Noon to 8 P. M. S. E. 32 miles: a brig in sight. At 8 P. M. dark gloomy weather with packed masses of clouds to the S. W., vivid lightning. Vessel steering N. E. 23 miles, from 8 to midnight, when a strong breeze from the S. W. and the S. Westerly sea very high, dark threatening weather, vessel running 8 knots to the N. E.

1st December.—A. M. Increasing gale; at 4 A. M. violent and severe gale S. S. W. if possible worse than before. 7, tremendous S. S. W. gale, Bar. 29.30 to 9 A. M. when Bar. on the rise; at 10 A. M. Bar. 29.45 gale moderating; at 11, 29.55 strong gales from South; Lat. indifferent obs. $9^{\circ} 55' N.$ Long. $88^{\circ} 00' E.$, Bar. 29.65., Ther. 82° , P. M. Wind S. S. W., course N. E. $9\frac{1}{2}$ knots, and run 107 miles; to midnight strong gale; 3 P. M. Bar. 29.75. 10 P. M. 29.80. Wind South, midnight moderating and sky clearing.

2d December.—Midnight to noon N. E. $51\frac{1}{2}$ miles N. E. b. N. $49\frac{1}{2}$ miles. A. M. Wind S. S. E. 6 A. M. S. E. 11 A. M. E. S. E. At noon fine weather; Lat. $11^{\circ} 17' N.$, Long. $89^{\circ} 45'$, Bar. 29.90, Ther. 83° .

Madras. The COLONEL BURNEY.

The barque *Colonel Burney*, from Moulmein to Bombay passed by Galle on the 10th instant, under jury masts, having lost her main and mizen masts in a heavy gale on the 1st, in Lat. $6^{\circ} 50' N.$, Long. $85^{\circ} 20' E.$ —*Record, Dec. 30.*

Extract of a letter from Capt. DURHAM, of the Barque COL. BURNEY to his owners dated, 28th December, 1843.

MESSRS. APCAR AND CO.

DEAR SIRS,—I beg to report the arrival of the Col. Burney here yesterday, after a passage of 33 days from Rangoon. I have lost main and mizen-masts by the deck during a heavy gale in Lat. 6° N., Long. 85° E., the vessel was thrown on her beam-ends; to save ship and cargo I cut away my masts, when she righted with 7 feet water in the hold.

Your obedient servant,

(Signed,) R. B. DURHAM.

Report from KAYTS, Ceylon, forwarded by Capt. BIDEN.

MY DEAR CAPTAIN BIDEN.—You will no doubt have heard of the gale we have lately experienced down here; and as it was evidently one of the rotatory description I send you an account of it, supposing that any information on this subject will be interesting. It appears to have travelled in a W. S. Westerly direction, the Southern portion of the circle passing over Kayts, Delft island and Paumbum: At Manar, although the weather had a wild appearance, it was not felt at all. I was myself at Paumbum at the time, where I noted the changes closely; but at the other places, the variations may not be so correct: still they are sufficiently so to trace the track of the gale. To begin then with my windward station, Kayts.

It commenced here from the N. W. about noon on the 1st; increasing in violence till 6 P. M. of the 2d, between which and midnight it blew with great fury, accompanied by a very heavy fall of rain. On the morning of the 3d it shifted to W. S. W. strong, and by noon moderated at South.

At Delft island on the 1st the wind which had been moderate all day at N. W. freshened towards evening from the same quarter, and gradually veered round to between W. N. W. and W. by S; at which by 6 A. M. on the 2d it was blowing a heavy gale. This continued all that day and night till 11.30 A. M. on the 3d when the wind suddenly

chopped round to S. by W. and moderated by daylight ; next morning the wind was from S. S. E. and eventually settled at S. E.

At Paumbum.

1st A. M. Wind fresh at N. W.

P. M. More moderate at N. E. ; freshening during the night but fine.

2d. A. M. 6 Moderate N. N. W. very cloudy.

10 Freshening and veering to the Westward ; Ther 72° ; lower than it has ever been before during the last 4 years ; noon very fresh at N. W. with confused appearance, scud flying fast and low from North, 3 P. M. fresh, W. by S.

6. Ditto W. S. W. Scud still flying from North, but not so fast ; heavy bank of rain to N. E. but without any appearance of wind from that quarter.

9. Increasing at W. S. W. Midnight, hard gales at W. S. W. with very heavy rain.

3d. A. M. 6, Sky a perfect lead colour, gale and rain continuing from same quarter till 3 A. M. when it moderated and P. M. veered to S. S. W. and South ; scud now flying to N. E.

6. Strong breezes from S. W. to S. S. E. the wind not remaining steady for two consecutive minutes, still thick and hazy with rain.

4th A. M. Fresh South to S. S. E. and hazy.

You will find it easy with these dates to trace the progress of the whirlwind from Kayts to Paumbum, and if it continue in the same course it must coast along the shore of Madura and part of Tinnevely, going to sea again from the Malabar coast at a little to the North of Cape Comorin ; leaving Colombo untouched ; a matter to be rejoiced at, as the craft there at this fine season would hardly have been prepared for a blow from any point South of West.

My vessel had a very narrow escape, having parted and drifted to within 80 yards of a reef. She lost bowsprit, rudder and boats, had her stern stove in and was otherwise much injured ; but fortunately the wind coming round enabled her to get a start off and run round to leeward of the island where I picked her up a sad plight. We are repairing her now and I hope to be at sea again by the end of the week.

(Signed) J. J. FRANKLIN.

Barque CARENA from Ceylon towards Madras, reduced to Civil time.

A long detailed extract of this vessel's log was kindly sent me by Capt. Biden, and it would have been highly interesting from her position between 5° and 13° North Lat., had any Long. accompanied it, but unfortunately there was none. And we are thus reduced to the necessity of saying only that she had,

On the *25th November*.—Winds E. to N. W. in Lat. at Noon $4^{\circ} 58'$ N.

26th November.—Winds Northerly in $5^{\circ} 43'$ N., strong breezes and cloudy.

27th November.—Bar. 28.80., (by Capt. Biden's correction, 29.50.,) No observations, winds apparently N. E. to N. N. E.

28th November.—Wind N. E. by E. to N. N. W. No observations, weather hazy and much rain.

29th November.—N. W. to N. N. E. and again W. N. W.; light winds, cloudy and squally.

30th November.—N. N. W. Westerly and S. S. W. winds. Lat. $6^{\circ} 57'$ North.

1st December.—Lat. $9^{\circ} 51'$ N. winds Southerly increasing at 4 P. M. to a strong gale obliging the vessel to scud under a reefed fore-sail.

2d. December.—Moderating, Lat. $12^{\circ} 17'$ N. P. M. S. E. wind.

*Abridged Log of the Brig BITTERN, Captain G. SCOTT, from the Mauritius to Madras, forwarded by Capt. BIDEN.**

28th November 1843.—1 P. M. Wind W. S. W. fresh breeze and cloudy; 7, Bar. 29.50; at 10 P. M., hard squalls.

29th November.—11 wind S. W. first part strong breezes, middle and latter parts fresh gale, with squally weather and rain. 9 A. M. Bar. 29.35. Noon, fresh gale and cloudy, Lat. Obs. $5^{\circ} 33'$ N.

1 P. M. wind S. W. fresh gale and squally; at 4 Bar. 29.24; at 3 wind S. S. W.; at 5 South more moderate but threatening in appearance, made preparation for bad weather; 10 wind S. S. E., 12 squally with small rain.

* With this log also no Longitudes are given.

30th November.—At 3 A. M. wind East; at 5, wind E. N. E. squally; at 7 Bar. 29.34; noon, fresh gale and cloudy, Lat. Obs. $8^{\circ} 23' N.$

1 P. M. wind E. N. E. fresh gale and cloudy, at 3 wind N. E. by E. at 5 Bar. 29.30, 8 Bar. 29.40. Hard squalls with small rain; 11 wind E. N. E. fresh gale throughout with frequent hard squalls and small rain; under storm trysails.

1st December.—3 A. M. furled the fore topsail, 5 Bar. 29.30, 7 more moderate, 10 wind East, Bar. 29.24. Noon, fresh gale and cloudy, Lat. Obs. $9^{\circ} 49' N.$

1 P. M. wind S. E. fresh gale with hard squalls, 5 wind South, 8 hard squalls with small rain, 6 Bar. 29.35, fresh gale throughout with frequent hard squalls and small rain. Midnight Bar. 29.49.

2d December.—2 A. M., wind S. S. E. very hard squalls with small rain, 4 Bar. 29.60, 5 more moderate, 11 wind S. E., noon more moderate, Bar. 29.60. Lat. Obs. $11^{\circ} 21' N.$ after which fine weather.

*Report from the Barque MARY IMRIC, Captain BOYD, forwarded by
Captain BIDEN.*

30th November, 1843.—Blowing a strong breeze from N. N. E. all possible sail set, daylight the weather became very cloudy, heavy dark masses rising in the North and passing over with increasing velocity to the Southward. Noon, weather dismally dark, with a very suspicious appearance, sun obscured, Lat. by account $12^{\circ} 20' North$, P. M., the sea rising and the breeze increasing fast, took in all small sails and sent down royal and top-gallant yards, and close reefed the top-sails, indeed at this time I would have been induced to lay the vessel to, the appearance of the weather was so bad; as well as being under the impression, that the farther you run into a storm the more likely you are to suffer from its effects* had the Barometer not kept well up; at daylight it stood at, .. 30 03 *

At noon it rose to, 30 11

2 P. M. down to, 29 83

where it continued till midnight, at which time it blew a terrific gale with a heavy cross sea, wind steady at N. N. E. and scudding under

* This is the old axiom. It depends of course on which side of a storm circle the ship is, to be correct. A ship should certainly never *run into* a storm, but she may as certainly often *run out of it*.—H. P.

two close reefed top-sails ; I may here add that I never saw the mercury fluctuate so much, although it never fell lower than 29. 60.*

1st December.—From midnight till daylight, the gale continued with unabated force, with frequent hard squalls and heavy rain, and a dreadful sea running, that washed away nearly all the bulwarks, and drowned nearly the whole of the live stock. The sea was uncommonly cross, and evidently produced from other causes, besides the gale we were then in, and had we not taken the precaution to get every thing well secured on deck, as well as made secure aloft, the consequences might have been serious ; towards noon the weather cleared away so far as to enable me to measure the sun's altitude, which placed us in $10^{\circ} 4' N.$ Long. $84^{\circ} 1' E.$ P. M. the gale continued with very unsettled weather, wind veering round to the Westward, Bar. 29.60 ; towards midnight weather tolerably clear overhead, but a dense wild looking haze all round the horizon, Bar. 29.25.

2nd December.—The wind continued to veer to the Westward till 2 A. M. when it fell nearly calm, the weather then looking dismal with continued flashes of vivid lightning and loud peals of thunder, got all the canvas secured as fast as possible, which we had just time to do when the gale burst out from about S. S. W. Fortunately we were prepared for it, and had nothing set but a new small close reefed main-top sail, which we lay to under till noon, Bar. stationary at 29.25. It is impossible for me to describe the sea that we had to contend with. It had been blowing a gale (and no ordinary one,) from N. N. E. round to S. S. W. for the last three days, and every way we looked a mountain of water appeared coming towards us. Shortly after noon the Bar. started up to 29.80, but the gale continued without any abatement till midnight.

3rd December.—The gale began gradually to abate and the Sea to fall ; Barometer at daylight up to 29.90.

Abridged Log of the Ship FYZUL CURREEM, Captain J. BALLANTINE, from Calcutta towards the Mauritius, reduced to civil time.

26th November, 1843.—Noon, fine breeze N. and cloudy, Lat. $7^{\circ} 50' N.$ Long. $83^{\circ} 59' E.$, course South, 7 knots per hour. P. M. and to midnight squally. Wind steady at North and N. by E.

* These fluctuations are highly interesting particularly when limits are given.—H. P.

27th November.—A. M. to 9; Wind about North; 10 to Noon N.N.W. squally; noon Lat. $5^{\circ} 11'$ N. Long. $83^{\circ} 36'$ E., 9 P. M. heavy squalls, wind and rain from N. N. W. to midnight.

28th November.—A. M. to noon, fresh breeze, &c. tolerably clear; wind varying N. N. W. to N. W. b N., 8.30 A. M. an English bark standing to the Northward and Eastward. Noon Lat. $2^{\circ} 6'$ N. Long. $83^{\circ} 40\frac{1}{2}'$ E.; by 8 P.M. increasing to fresh gale W. b S.; to midnight course South, 8 knots throughout.

29th November.—A. M. fresh gale West increasing with heavy squalls to a strong gale and sea by noon, when Lat. $00^{\circ} 54'$ S., Long. $84^{\circ} 30\frac{1}{4}'$ E., Current of about 24 miles to the Eastward. P. M. Gale continuing and increasing at times, to midnight, wind strong at West and course South 7 and 8 per hour.

30th November.—8 A. M. more moderate, noon fresh gales. Wind steady at West throughout. Lat. account $3^{\circ} 50'$ S., Long. $85^{\circ} 27'$ E. Current of 21 to the Eastward. P. M. more moderate and clear, wind West; and at 7 P. M. W. $\frac{1}{2}$ S., midnight moderate and clear, a strong sea from the W. S. W.

1st December.—A. M. a little squally; by 10 A. M. wind at N. N. W. light 3 knot breeze; noon fine, Lat. $5^{\circ} 39'$ S. Long. $85^{\circ} 37\frac{1}{4}'$ E. Current and sea estimated by Captain Ballantine at $29'$ to the E. N. E. a strong sea from the W. S. W. P. M. winds N. N. W., and at 9 N. W. and fine to midnight.

2d December.—A. M. to noon, light N. N. E. winds with a heavy head sea. (Ship steering S. W. by S.) Lat. $6^{\circ} 41'$ S. Long. $85^{\circ} 00\frac{3}{4}'$ E. no current, but the sea has retarded the ship's progress 10 miles.

MAURITIUS SHIP NEWS *from the Englishman.*

We are indebted to Captain Renaut of the Ship Active, for the following details respecting the hurricane which he experienced on the 30th November. On the 24th November, the weather was very tempestuous, blowing from the S. W. and veering round to the N. W. then N. E. and finally settled at E. on the 30th, and blew a perfect hurricane for 48 hours in Lat. $10^{\circ} 23'$ S. and Long. $85^{\circ} 17'$ E. The gale abated on the 2nd December in Lat. $13^{\circ} 58'$ S. and Long. $13^{\circ} 31'$ E. The Ship sustained the loss of a few sails and a quarter boat; but fortunately none of the coolie passengers on board sustained any injury.

The Bark Ward, Chapman, from Bombay, reports having experienced a hurricane in Lat. $12^{\circ} 30'$ S. and Long. $84^{\circ} 30'$ E. commencing on the 30th November from S. W. and blowing right round the compass. It abated however on the 3rd December, Lat. 14° S. and Long. $79^{\circ} 30'$ E; she lost a few sails.

Abridged Log of the Barque FLOWERS OF UGIE, Captain ANNAND, from Madras to the Mauritius, reduced to civil time.

24th November, 1843.—The Log worked back from 25th, gives for this day, Lat. $4^{\circ} 57'$, Long. $84^{\circ} 33'$ E. with light Southerly and S. S. W. airs and breezes, from noon to midnight.

25th November.—A. M. heavy squalls and rain, wind S. and S. b W. to noon when strong gale about S. S. W. Lat. $5^{\circ} 36'$ S. Long. $85^{\circ} 27'$ E., Bar. 29.80, Ther. 81° high cross sea. P. M. to midnight strong gale S. W. by S. with squalls and rain; preparing for bad weather. Midnight Bar. 29.68.

26th November.—To Noon gale increasing from S. W. Lat. $6^{\circ} 5'$ S. Long. $86^{\circ} 21'$ E., Bar. 29.62, Ther. 81° . P. M. increasing and S. W. b. W. 6 P. M. hove to under bare poles. Heavy sea running, midnight the same.

27th November.—4 A. M. weather a little clearer, noon heavy gales Lat. $6^{\circ} 20'$ S. Long. $88^{\circ} 4'$ E., Bar. 29.57, Ther. 83° . Easterly current of 60' since noon of the 26th. P. M. wind W. N. W. At 10 N. W. to midnight.

28th November.—4 A. M. wind hauling to the North, being N. N. W., at 2 A. M., when the ship bore up and ran 27' to the S. W. by S. when hove to again, having sprung the fore-topmast in rolling. Noon wind about N. N. W. Lat. Obs. $7^{\circ} 41'$ S. Long. $88^{\circ} 49'$ E., Bar. 29.63. Ther. 84° . P. M. wind North. Strong gales and heavy sea to midnight.

29th November.—A. M. apparently moderating, noon strong gales Lat. $8^{\circ} 46'$ S., Long. $87^{\circ} 40'$ E., Bar. 29.67, Ther. 83° . 10 A. M. bore up and steered S. W. b S., P. M. strong gale N. N. E. Ship running to the S. W. b S. to midnight. Bar. at 4 P. M. 29.66 and wind at 10 P. M. N. E., midnight strong gales and Bar. 29.69.

30th November.—At 8 A. M. wind N. E. b E., strong gale heavy squalls, turbulent sea, and Bar. falling, 9 A. M. hove to again, hav-

ing since 10 A. M. on the 29th, ran 158 miles to the S. W. b. S., noon heavy gale, Lat, $10^{\circ} 52'$ S., Long. $86^{\circ} 24'$ E. Bar. 29.59. Ther. 83° . P. M. wind N. E. Strong gales, heavy squalls and a dark cloudy appearance all round in the sky. 2 P. M. Bar. 29.58. At 10 P. M. Bar. 29.53. Gale very heavy; at midnight Bar. 29.49.

1st December.—2 A. M. wind E. N. E. 8 A. M. abating a little, 10:30 bore up again to S. W. Noon strong gales Lat. $11^{\circ} 2'$ S., Long. $86^{\circ} 6'$, Bar. 29.50, Ther. 84° . P. M. Wind N. E. b E., 4 P. M. Bar. rising, midnight strong gales and heavy squalls, ship running to the S. W.

2nd December.—4 A. M. to noon moderating; 10 A. M. Wind N. E. ship steering to S. W. Noon clearing away, Lat. $13^{\circ} 20'$ S. Long. $83^{\circ} 49'$ East. Bar. 29.83, Ther. 86° . P. M. fine E. N. E. breeze to midnight.

3rd December.—Noon fine, lat. $14^{\circ} 22'$ S. Long. $81^{\circ} 15'$ E., Bar. 29.87, Ther. 85° .

Abridged Log of the Ship JOHN FLEMING, Capt. CLERK, from Calcutta bound to Mauritius, reduced to civil time. N. B. Some additions made from a letter of Capt. CLERK's forwarded by Captain BIDEN.

21st November 1843.—The weather, from calm and cloudy with light airs on the 20th and 21st, is at 5 P. M. on the 21st marked as "heavy cloudy weather in the North West."

22d November.—At 5 A. M. the wind became steady at W. S. W. At noon fine and cloudy, Lat. $00^{\circ} 30'$ North, Long. $82^{\circ} 29'$ E. P. M. to midnight wind about S. W. ship running to S. E. and S. b E. 7 and 8 knots.

23d November.—A. M. squally; at 8 A. M. wind West, 8 knot breeze, course South. Noon strong breeze and cloudy, Lat. $2^{\circ} 15'$ S. Long. $83^{\circ} 30'$ E. Ther. 82° , Bar. 29.72. P. M. wind W. b N. and at 5 W. S. W., midnight heavy cloudy weather.

24th November.—A. M. increasing, noon under close reefs, strong gale W. S. W. and thick weather with rain, Lat, $4^{\circ} 47'$, Long. $84^{\circ} 30'$ E. P. M. to midnight wind W. b S. hard squalls, strong gale and heavy sea. Course to the S. and S. S. E. 5 knots.

25th November.—A. M. moderating a little, high head sea, noon Lat. $5^{\circ} 1' S.$, Long. $85^{\circ} 31' E.$, Bar. 29.70., Ther. 78° P. M. wind W. S. W. more moderate; to midnight heavy head sea continues.

26th November.—A. M. to noon wind W. S. W. At noon every appearance of a gale, Lat. $5^{\circ} 58' S.$ Long. $86^{\circ} 24' E.$, P. M. wind marked S. W. b. W. blowing very hard; Bar. falling to 29.50, lying to under storm staysails, head to the S., midnight blowing excessively hard.

27th November.—A. M. Sea increasing; at noon Lat. $6^{\circ} 26' S.$, Long. $87^{\circ} 10'$, Bar. 29.50. Ther. 80° , P. M. Bar. 29.40, heavy gale (apparently from N. W. or W. N. W.*) continues till midnight.

28th November.—A. M. wind drawing to N. W. (ship coming up to W. S. W.) Noon more moderate, Lat. $7^{\circ} 7' S.$ Long. $87^{\circ} 24' E.$, Bar. 29.50, Ther. 80° . P. M. wind marked N. N. W. gale continuing; very irregular sea. At 8 P. M. wind had veered to N. E., ship running S. W. b S. and S. W. 98 miles from 11 A. M. to midnight when strong gale.

29th November.—A. M. Increasing to a hurricane about N. E.; noon Bar. 29.00, Ther. 79° , Sympiesometer 28.9, ship on her beam ends. Lat. $8^{\circ} 47'$, Long. $86^{\circ} 20'$. P. M. Hurricane between North and East, head to N. N. W., Bar. broke; oil disappeared in the Simp. At midnight ship buried in the sea and half swamped.

30th November.—A. M. Cut away the top masts which relieved her a little; boats blown into the rigging and over the poop, at 4 blowing a hurricane still between North and East.

1st December.—To noon still blowing a heavy gale; Sympiesometer 28.4. at noon, oil having re-appeared; at 5 A. M. set a storm stay-sail, moderating to midnight.

2d December.—To noon moderating, wind not marked, Lat. obs. $14^{\circ} 5'$ Long. $79^{\circ} 29'$; 7 P. M. wind marked N. E. At midnight fine.

* Nothing is marked in the Log, but it is clear that the wind must have been to the Northward of West, at least since midnight, by the Lat. for lying to under storm staysail, with a gale from S. W. b W. the ship must have been making nothing at least from noon to nearly midnight, when if we suppose the gale to have drawn to the Northward of West she may in the 12 hours to noon of the 27th have drifted back and made the most part of the 41 miles of Lat. which appear on the log to noon of the 28th; for it was only one hour before that time that she bore up.

Abridged Log of the Barque ELIZABETH AINSLIE, Captain T. LYS-TER, from Madras to the Mauritius, reduced to Civil time.

23rd. November, 1843.—Noon, Lat. Obs. $3^{\circ} 5' S.$ Long. $84^{\circ} 3' E.$ Bar. 29.80. Ther. 82° . During the preceding 24h had run 5 to 7 knots to the S. b. E. with winds varying from to S. W. b. W., wind W. b. S. to 8 A. M. when W. to noon, fresh breeze and latterly squally. P. M. the wind W. to midnight.

24th November.—Wind W. b. S. to 8 A. M. and W. to noon, when Lat. $5^{\circ} 10' S.$, Long. $84^{\circ} 25' E.$, Bar. 29.78. Ther. 79° . P. M. fresh breeze and squally wind W. to midnight.

25th. November.—To 5 A. M. Wind S. W. and to noon, S. S. W. and high swell from the Southward, Lat. Obs. $5^{\circ} 41' S.$ Long. $85^{\circ} 50' E.$ Bar. 29.78. Ther. 80° P. M. fresh gale increasing from S. W. b. S. and S. W., at 11 P. M. W. S. W.

26th November.—A. M. fresh gale W. S. W. to noon, and high sea from the Southward; noon Lat. $6^{\circ} 36' S.$ Long. $86^{\circ} 53' E.$ P. M. hard gales and heavy squalls W. S. W. hove to till midnight head N. N. W. when *more moderate*.

27th. November.—Made sail to the Southward, and to noon ran 62 miles to the S. b. W. Winds 1 A. M. W. N. W.; 7 A. M. W. b. N.; at 10, W. N. W. fresh gales and cloudy with drizzling rain and high sea; noon Lat. Obs. $6^{\circ} 27' S.$ Long. account $87^{\circ} 22' E.$ Bar. 29.60. Ther. 80° . 1 P. M. wind N. W., 6 P. M. N. N. W. 10 P. M. North; midnight N. N. E.

28th November.—3 A. M. Hard gale from N. E. with heavy squalls; 4, hove to under close reefed main-top-sail, Bar. 29.30; noon tremendous sea, Lat. acct. $8^{\circ} 21' S.$ Long. $87^{\circ} 02' E.$ Bar. 29.5. Ther. 80° . To 5 P. M. wind E. N. E.; 6 P. M. East. At 5 P. M. Main-top-sail blown to pieces and ship labouring greatly, set the reefed fore-sail and kept the ship before the wind. At 6 P. M. fore-sail blown out of the bolt ropes, broached to with head to the N. N. W. midnight, gale blowing with great violence, and tremendous high sea.

29th November.—5 A. M. A sudden lull and high confused sea. 7 A. M. commenced blowing from the North; noon, heavy thick cloudy weather all round, with a high confused sea, hard puffs and lulls at times, Bar. 29.00, Ther. 77° . At 1 P. M. wind S. E.; at 6, to 8, North; at 9, N. N. W.; at 12, North, heavy puffs, and lulls with a high sea. Bar. 29.00.

30th November.—Wind North to noon, at 2 A. M. Bar. 28.90. At 4, Bar. 28.80.; at day-light blowing very hard with tremendous gusts at times. Noon, Bar. 28.80, Ther. 78°; lying to with ship's head to the West. P. M. commenced a perfect hurricane, ship on her beam ends, and expecting masts to go at every moment, every thing ready to cut away. 4 P. M. Bar. 28.90.; 6 P. M. still blowing violently. 7, wind North, the furled main-sail blown from the gaskets. 8, Bar. 28.90, wind N. N. E. Midnight, weather the same, Bar. 29.00. lying to, head West to W. N. W.

1st December.—Daylight inclined to moderate, wind from N. N. E., to noon Bar. 29.10, head N. W.; noon, heavy puffs and lulls with thick cloudy weather, and much rain, Bar. 29.20. Ther. 78°. At 6 P. M. Bar. 29.30. At 8 P. M. Bar. 29.35., midnight 29.45. P. M. wind N. E.

2d December.—6 A. M. Bar. 29.50., noon 29.70. making sail; Lat. 12° 34' S., Long. 81° 55' E., pleasant breeze N. E.; 4 P. M. E. N. E., 9 P. M. N. E.

3d December.—Noon, Lat. 14°. 6' S. Long. 80°. 53' E. Fine weather.

Abridged Log of the Ship EDMONSTONE, Capt. MACDOUGAL, from Calcutta bound to Mauritius, reduced to Civil time.

25th November.—At noon in Lat. 6° 15' S. Long. 82° 30' E., P. M. Winds variable from the S. W. to S. S. E.; to midnight, light breezes and cloudy.

26th November.—Steady light breeze to noon from S. S. W., no observation, Lat. account 6° 42' S. Long. account 83° 06' E. P. M. to midnight, winds S. S. W. to South, brisk breeze.

27th November.—A. M. strong breeze about South, with hard squalls and turbulent sea. Lat. Obs. 6° 58' S. Long. 83° 36' E., P. M. variable strong breezes from the Southward with hard squalls. Midnight "strong gale."

28th November.—A. M. strong gale and mountainous sea. Wind about S. S. W. Noon, Lat. Obs. 6° 50' S. Long. 84° 04' E. P. M. wind S. W.; gale increasing to midnight.

29th November.—2 A. M. wind W. S. W. severe gale; 9. A. M. hove to under reefed try-sail, wind West, no observation; Lat. account 7° 12' S. Long. 85° 02' E. P. M. "violent gale W. b. S.," heavy cross sea.

8 p. m. " wind hauled to W. N. W. and moderated, Bar. rising; 10 p. m. W. N. W. made sail and stood to the S. S. E. 9' till midnight.

30th November.—3 a. m. wind N. W.; at 6, N. N. W. Daylight, gale increasing, and Bar. falling; to noon, severe gale N. N. W. with furious gusts, Lat. account $9^{\circ} 3'$ S. Long. account $85^{\circ} 4'$ E.; 9 p. m. wind N. N. W. severe gale and high cross sea; at 8, wind N. b. E. to midnight, when Bar. rising a little.

1st December.—By 9 a. m. strong gales N. E., to noon Lat. by account $11^{\circ} 15'$ S. Long. account $84^{\circ} 22'$ E. p. m. the same, wind N. E. to midnight; carried away chain plates and hove to; midnight more moderate.

2d December.—a. m. moderating to noon; wind N. E. to 9 a. m. and North to noon, when Lat. $12^{\circ} 23'$ S. Long. $84^{\circ} 30'$ E. p. m. wind N. E., moderate breeze and heavy cross sea.

3d December.—Noon, Lat. $13^{\circ} 51'$ S., heavy sea still continuing, wind E. N. E. and fine.

Note.—Captain MacDougal informs me that during the storm, his Bar. was at 29.38 and the Symp. at $29^{\circ} 28'$ the lowest, the Ther. steady at 72° throughout the gale.

The Lat. and Long. given, are partly from the chart, and partly from account worked either forward or backward to the nearest day of observation, Captain McDougal observes that having 220 emigrant coolies on board, he was obliged, during the height of the storm, to steer various courses to obtain for them as much comfort and safety as the weather would allow of, so that he can only give me limits *within* which he thinks the vessel's position must have been.

The log gives as nearly as can be ascertained, a current of 149 miles to the South and 116 miles to the West, but it is necessarily very imperfect, and the set of the storm wave and current on one day was doubtless counteracted, in some degree, by that on a different part of the storm circle on another.

Abridged Log of the Barque BABOO, Captain STUART, from Madras to Mauritius, reduced to Civil time.

26th November, 1843.—At Noon, Lat. $6^{\circ} 17'$ S. Long. about $83^{\circ} 40'$ E., wind S. W. b. S., ship steering to the S. E. b. S. $4\frac{1}{2}$ knots, squally and rain. Spoke the Tartar 7 days from Ceylon. Midnight, wind S. S. W.

27th. November.—A. M. to Noon strong breeze and cloudy ; no Obs. ; P. M. fresh gale S. S. W., 6 P. M. South, course E. S. E. Midnight heavy squalls and rain.

28th. Nov.—A. M. Heavy squalls and rain continuing, wind from S. to S. W., course S. E. to S. S. E. Noon Lat. $7^{\circ} 8'$ S. Long. $85^{\circ} 10'$ E., heavy gales S. W. b. W. and sea. P. M. Wind W. S. W. at 6 and to midnight when strong gales and rain ; course marked as S. b. E. to S. b. W. In the Newspaper report Captain Stuart states this to be the day on which the wind became very tempestuous.

29th. Nov.—A. M. Strong gales continuing W. S. W. and at 6 A. M. this day, course S. S. W. Noon heavy gales throughout. P. M. increasing, wind marked N. W. Course S. W. and at midnight S. b. W,

30th. Nov.—Daylight heavy squalls and rain N. W. Course S. W., 7 knots. Noon. Lat. $9^{\circ} 2'$ S. Long. $85^{\circ} 9'$ E. strong gale. P. M. wind N. W. Midnight heavy squalls and rain.

1st December.—Wind N. W. to noon ; course S. W. b. S. and S. W. Lat. $11^{\circ} 0'$ S. P. M. heavy gale N. N. W. Course, $7\frac{1}{2}$ knots to S. W. and at 6 P. M. to W. S. W. Heavy gale and rain ; midnight increasing.

2d. December.—Wind and weather as before, course W. S. W. $7\frac{1}{2}'$; Noon, no observation. P. M. wind marked Easterly, course W. b. S. Heavy gale and squalls to midnight.

3d. December.—Wind Easterly, course W. b. S. $7\frac{1}{2}$ knots. Noon, heavy gale, no observation. P. M. wind Easterly, course W. S. W. 6 P. M. wind N. E. Hove to at 8 P. M.

4th. December.—Mizen top-mast went, lost main-yard and sprung main-mast, ship labouring *as if in broken water on a reef*. No observation. P. M. fresh gale *and fine*, wind E. N. E. lying to ; midnight moderate and fine.

5th. December.—6 A. M. bore up to the W. by S. Wind Easterly, noon Lat. Obs. $18^{\circ} 6'$ S. Fine weather.

Abridged Log of the Ship SOPHIA, Capt. ANDREW, from Bombay towards the Mauritius, civil time.

On the 22d November.—At noon the Sophia was in Lat. $4^{\circ} 53'$ S. Long. $79^{\circ} 54'$ E. standing till midnight to the S. S. E. with a moderate breeze from the S. Westward, squally weather.

23d November.—Threatening dark weather and puffy, to noon, when Lat. $5^{\circ} 54'$ S. Long. $80^{\circ} 30'$ E. p. m. to midnight, strong breeze and cloudy; ship standing to the E. S. E. and E., wind S. S. Westerly, throughout heavy head swell; midnight more moderate.

24th November.—At 4: 30 A. M. a heavy squall and shift of wind from S. S. E. to W. N. W. when a strong breeze and heavy head sea, ship standing to the S. E.; noon Lat. account $6^{\circ} 30'$ S. Long. $81^{\circ} 20'$ E. p. m. wind S. W. b. S.; midnight squally and calm.

25th November.—Throughout variable, squally and calm; noon Lat. Obs. $5^{\circ} 50'$ S. Long. $81^{\circ} 49'$ E. Midnight moderate and squally weather.

26th November.—Moderate S. S. W. breeze to noon, when Lat. Obs. $6^{\circ} 24'$ S. Long. $82^{\circ} 53'$ E. 6 A. M. saw the bark Ward, Chapman, from Bombay; 8 P. M. wind S. fresh breeze and cloudy, ship standing to the West and W. b. N.

27th November.—Wind South to noon. Standing S. E. b. E. to 8 A. M. when W. b. N. for 2 hours and again S. E. b. E., strong breezes and a heavy, S. E. swell; noon Lat. Obs. $6^{\circ} 36'$ S. Long. not given; p. m. to midnight hard squalls.

28th November.—Wind from S. b. E. to S. S. W. of variable strength, and with thick weather, noon Lat. $6^{\circ} 23'$ S. Long. $81^{\circ} 34'$ E. p. m. increasing with a heavy head sea from the Southward from 3 P. M. to midnight, wind S. W. and S. W. b. W.

29th November.—Wind S. W. b. W. to S. S. W. to noon strong breeze and high head sea. Lat. noon $6^{\circ} 48'$ S. Long. $82^{\circ} 00'$ E. p. m. increasing in puffs Westerly and W. N. W. "very dirty appearance all round the horizon."

30th November.—Wind N. W. throughout, A. M. increasing to a gale with tremendous puffs at intervals; daylight heavy gale; noon hard gale, no observation; p. m. heavy sea in all directions; ship lying to, up S. W. off S. S. W. 1 and 2 knots.

1st December.—A. M. heavy gales and a fearful sea running in all directions, lying to under a close reefed main-top-sail and fore-sail. 6 A. M. moderating a little. Wind marked N. W. throughout, no observation; p. m. still moderating. Midnight heavy sea running from the S. Westward; wind veering a little to the Northward apparently.

2d December.—A. M. wind marked North, fresh breeze and cloudy with cross sea; noon Lat. $9^{\circ}56'S.$ and Long. $81.48'E.$, wind and weather the same to midnight.

3d December.—Wind marked N. N. E. to midnight, and fine weather; noon Lat. $11^{\circ}7'S.$ Long. $80^{\circ}49'E.$

Abridged Log of the Ship FUTTLE ROZACK, Captain RUNDLE, from Calcutta to Mauritius, civil time.

This very able, careful, and really scientific log, which reflects the highest credit on Captain Rundle, was kindly placed at my disposal by him, being his private one. Every nautical and scientific man will I am sure join with me in wishing we had many such observers afloat, and access to their observations. I need not say that with the necessary abridgment as to manœuvres and private matters, I have as nearly as possible preserved Captain Rundle's expressions.—H P.

On the 20th November, 1843.—The Futtle Rozack, at noon was in Lat. $0^{\circ}39'N.$ Long. by 2. Chrs. $82^{\circ}30'E.$ and Bar. 29.93.* Ther, 78° Winds variable between W. S. W. and S. W. with light fine weather; at 8 P. M. a fresh breeze and squalls, sun-set very fiery, Bar. is high. At midnight squalls less frequent, course S. a little Easterly.

21st November.—1 A. M. to 4, strong breeze smart squalls and torrents of rain. Noon, pleasant weather, Lat. Obs. $1^{\circ}22'S.$ Long. $83^{\circ}10'E.$ Bar. 6 A. M. 29.93. Ther. 79° ; noon Bar. 29.93. Ther. 82° , winds, A. M. S. W. to W. N. W. and at times South. P. M. moderate breeze and passing squalls; a long Southerly swell just perceptible, clouds A. M. spherical cumuli and nimbus. P. M. cumuli and dark nimbi; wind P. M. West and W. N. W. and N. W. in the squalls; P. M. Bar. 5 P. M. 29.93. Ther. 80° , at 11 P. M. Bar. 29.03. and Ther. 80° . At 9 P. M. Capt. R. remarks, "I observed those modifications of lightning more like the Aurora Borealis which I have seen in the North sea, or rather more like the Aurora Australis which I have seen off Van-Dieman's Land and New Zealand. I have never seen it in low Lats. but as a precursor of strong weather. It gradually lightens up the western horizon with a sudden dark red glare, and thus flickers about for a few seconds and gradually disappears. Bar. is still high. The stars too have a very sickly appearance, and a peculiar

* As corrected by comparison with the Standard at Calcutta.—H. P.

dancing motion. I thought at first my eyes deceived me, but my mates observed the same; I suppose occasioned by some dense vapour."

22d November.—A. M. wind marked S. S. W. to West; course from 3 to 7 knots to the Southward. Squally, making preparations for bad weather. Noon, Lat. Obs. $3^{\circ} 18'$ S. Long. Chr. $83^{\circ} 22'$ E. Lunars $83^{\circ} 10'$ E. Current for the last 24 hours S. E. b. E. 26'. Clouds A. M. cumulo stratus with flying nimbus, Bar. 1 A. M. 29.93. Ther. 79° ; 6 A. M. $29^{\circ} 93'$ and 78° ; noon $29^{\circ} 88'$ and 82° .

P. M. Squally, winds West to W. b. N. 4 P. M. scud flying swiftly to the Southward, 8 P. M. observed many phosphoric flashes in the sea, the luminous space from one flash as large as the cutter; running 6 and 7 knots to S. b. W.; midnight fresh breeze. Bar. 9 P. M. 29.91, Ther. 80° ; at 10 P. M. the same clouds P. M. at intervals lofty cirrhi, then again obscured, a nimbus and light scud flying to the South above all.

23d November.—A. M. to noon, winds West to S. W. 6 and 7 knots, breeze to noon, when Lat. $5^{\circ} 22'$ S. Long. $83^{\circ} 53'$ E., current $59'$ N. E. b. E. for the last 24h. Bar. A. M. 29.70. Ther. 76° ; at 8 A. M. $29^{\circ} 50'$ and 77° ; at 10 P. M. 29.53 and 78° . Noon 29.46 and 80, clouds hemispherical cumuli interspersed with ponderous nimbi.

Capt. R.—remarks. "I find Bar. considerably fallen with an exceeding long swell from the Southward, and at 7 a high N. N. W. sea meeting the Southerly swell created an exceedingly turbulent sea. In the squalls the sea has a strange appearance, the two seas dashing their crests against each other shoot up to a surprising height and being caught by the West wind, it is driven in dense foam as high as our tops. The whole horizon has the appearance of ponderous breakers.

At 8, Bar. still falling; has there been a gale? Much electricity by the appearance of the clouds. Current 59 miles N. E. b. E. $\frac{1}{4}$ E. this 24h. P. M. breeze decreasing to $1\frac{1}{2}$ knots, winds West to South and at times calm. Clouds, strata and nimbi, making preparations for bad weather, appearances being suspicious, 11. 30 P. M. Lat. by Aldebaran $5^{\circ} 37'$ S., midnight squally, rain and calms, dark dismal appearances all round and increasing Southerly swell.

24th November.—Dark and gloomy winds variable from S. E. to S. W., Noon, Lat. $5^{\circ} 32'$ S., Long. $84^{\circ} 49'$ E., Bar. 5 A. M. 29.57. Ther. 77° . At 9, 29. 63 and 78° , at noon, 29. 64. and 80° . Clouds, low strata and nimbus. Currents apparently 30 miles N. E. b. E. $\frac{3}{4}$ E. for the last 24h.

P. M. A French and English barque in company, the English we supposed the Baboo, Capt. R. remarks "I do not like this gloomy weather; with wind lulling and then coming on again with a warning noise* there either has been or will be bad weather. At 4 calm, at 5 severe squalls from S. S. W. tremendous high sea from the Southward, ship rolling dreadfully at intervals. Bar. at 4 P. M. 29.63; at 8 P. M. 29.63. clouds marked as very low, scudding stratus to the Southward.

25th November.—A. M. wind South veering to S. W. "and vice versa," strong gusts from S. to S. W. with a high cross sea, occasioned by a short Northerly sea meeting the long South swell. Noon, strong gale at intervals, but decreases as the wind hauls to S. W. increasing to Southward, ship under close reefed main-top-sail and fore-sail Lat. $5^{\circ} 42' S.$, Long. $85^{\circ} 3' E.$, standing to the E. S. E., a current N. W. $7\frac{1}{2}$ W. 27 miles in 24h. Bar. at 6 A. M. 29.64, Ther. 76° ; 9 A. M. 29.64 and 78° ; noon 29.63 and 80° . Clouds marked as low stratus, at times scudding to the South, at times stationary, then flying to the N. E.

P. M. strong gales S. W. b. S. mostly from S. W. attended with violent squalls. The rain water exceedingly cold, the sea water very warm, much more so than usually. Two Barques still in sight a head 5 P. M. mountainous sea from the Southward. Lofty scud above the lower strata of clouds flying quickly to the Southward at 7, breaks in the clouds, stars visible, but very dull. Bar. at 6 P. M. 29.62, Ther. 77° . At 10, 29.61. and 77° . Midnight wind in severe gusts succeeded by lulls of a few minutes duration. Clouds, low stratus not perhaps at 100 yards height, flying before the wind, breaks at times in the clouds, stars visible, with lofty scud flying with inconceivable rapidity to the Southward.

26th November.—A. M. Laid to under close reefed main-top-sail. Wind S. to S. W. squalls with rain, exceeding turbulent sea, noon Lat. $5^{\circ} 30' S.$ Long. $86^{\circ} 23' E.$, Bar. 6 A. M. 29. 62, Ther. 78° ; at noon 29.63, and 80° , clouds very low stratus with lofty scud above all flying to Southward, nimbus at intervals. Strong set to N. E. b E. 65 miles for the last 24th. P. M. fresh gale with furious squalls

* This warning noise I have more than once adverted to as certainly heard also on shore; see Jour As. Soc. 7th memoir Vol. XI, p. 1000. but it might *there* be supposed to arise from local causes. It is curious to find it remarked at sea by such an attentive observer. What can it be occasioned by? See remarks in summary.

and rain as cold as ice. Edging away to E. S. E. and S. E. b. E. under two close reefed top-sails, wind S. W. and at intervals W. S. W. and West. At 8, ropes and gear on deck brilliantly spangled by small luminous sparks from the sea which when examined appeared to be fragments of Medusæ. Again visible to the W. S. Westward the sullen red glare and flickering lightning; midnight squally, sea presenting flashes of phosphoric light in all directions, Bar. at 9 p. m. 29.63, Ther. 78°, clouds low stratus and ponderous nimbi.

27th November.—A. M. Increasing gale West, and at 2 N. W. to Noon; very high sea; at 1, wind *shifted* from W. S. W. to N. W. creating a tremendous sea; 10 A. M. struck by a heavy sea which laid the ship on her beam ends, lost main-top-mast; scudded before the wind to the S. E. under barepoles. A. M. Bar. falling rapidly, noon Lat. by D. R. 6° 38' S., Long. 86° 53' E., Bar. 5½ A. M. 29.63. and Ther. 79°. at 7h. Bar. 29.62; at 9h. 29.57; at 10h. 29.53; at 10½h. 29.50; at 11h. 29.47; at 11½ 29.44; at noon, 29.43 and Ther. 80°, clouds throughout exceeding low stratus.

P. M. Wind N. W. to 10 P. M. when North; course S. E. to 10, and then South; 3 feet water in the hold and most of the crew sick; vessel making only 4 knots per hour before the wind and labouring excessively. At 6 Bar. rising very fast, and at midnight falling again with dark gloomy threatening weather all round. Bar. at 2 P. M. 29.46, Ther. 81°; at 4h. Bar. 29.47; at 5h. 29.56; at 6h. 29.62; at 7h. 29.63, and Ther. 79°; at 9h. 29.61; at 9½h. 29.58; at 10½h. 29.62; at 11h. 29.50; at midnight 29.49. Ther. 77°, clouds, exceeding low stratus.

28th November.—Wind N. E. the whole 24h. A. M. increasing gale, wind *veering suddenly* to N. E., in a furious squall, lost fore-top-mast, ship lying to in much distress, Bar. 29.47 at 1 A. M. Ther. 79°; 2 A. M. 29.45; 5 A. M. 29.44; at 6h. 29.43. Ther. 80°; at 11h. 29.45 Ther. 81°, noon 29.49 and 82°. Lat. D. R. 7° 39' S. double Alt. 7° 47' Long. 87° 17' E., clouds low stratus with ponderous nimbi.

P. M. wind N. E. tremendous squalls blowing with inconceivable fury. The sea rising in huge pyramids yet having no velocity but rising and falling like a boiling cauldron. I have never seen the like before, I was in the height of the terrible hurricane of September 1834, in the West Indies, I have been in a typhoon in the China sea, in gales off Cape Horn, the Cape of Good Hope and New Holland, but

never saw such a confused and strange sea, I have seen much higher seas, and I am sure wind *heavier* but then the sea was regular and the wind steadier.*

10 P. M. dreadful squalls and a confused sea, both cutters washed away and mizen-topmast carried away, blowing still harder but Bar. rising; midnight tried to set the fore-sail and scud but it was blown to pieces clouds low stratus and nimbus; Bar. 2 P. M. 29.49. Ther. 82°; at 5h. 29.5 and 80°; at 10h. 29.53; at 11h 29.54; at midnight 29.56 and 79°.

29th November.—A. M. wind N. E. till noon, still blowing fearfully at times. Again tried to scud and ran S. by W. 58 miles to noon, Bar. steadily rising, 10 A. M. good sight for Chr, 2 A. M. Bar. 29.57; at 7h. 29.57. and Ther. 79°; at 10h. 29.58. and 80°; at noon 29.59. and 81°. Lat. 9° 47' S. Long. 87° 18'.

Noon blowing with inconceivable fury at times, with the sea I think more agitated and confused than ever; rising up in monstrous heaps and falling down again without running in any direction. Noon laid to again.

P. M. violent squalls and tremendous high sea, 3 feet water in the hold, wind N. E. to East. Midnight more moderate at times. Bar. 2 P. M. 29.60, Ther. 82°, and to midnight the same, but Ther. 79° clouds during this 24h. are exceeding low stratus scndding in all directions, upper strata to the Southward, lower to the west; at other times apparently to North and East.

30th November.—A. M. gale abates a little, high sea, ship lying to with tarpaulins in the mizen rigging, wind marked N. E. to East. Bar. 4 A. M. 29.60, Ther. 77°. Noon 29.61. Ther. 80°, Lat. 10° 55' S. Obs. 10° 48' S. by double altitudes Long. 86° 46' E. Clouds low stratus.

P. M. moderate gale at times but the sea does not go down; at 4, heavy rain, wind N. E. throughout, midnight the same weather; heavy squalls of rain. Bar. 1 P. M. 29.61. Ther. 81°; at 6h. 29.61. and 78°; midnight clouds low stratus with nimbi.

* This is by far the clearest, most graphic and seaman-like description of "the pyramidal sea" found at, or near, the centre of Indian Hurricanes and to which I have frequently alluded in former memoirs, which I have yet met with.

1st. December.—A. M. gale and sea moderating. Winds N. E. to noon when Lat. $11^{\circ} 10'$ S. Long. $85^{\circ} 47'$ E. Bar. 6 A. M. 29.61. Ther. 77° . Noon 29.62. Ther. 81° Clouds cirro-stratus and nimbi. P. M. squalls of rain at intervals, wind N. E. to midnight. 6 P. M. Bar. 29.63, Ther. 80° ; midnight 29.64. and 78° ; clouds cirro-stratus and ponderous nimbi.

2d December.—Moderate and passing squalls, sea much gone down, repairing damages. Winds East to noon when Lat. $12^{\circ} 30'$ Long. Lunars $85^{\circ} 26'$ E. Chro. $85^{\circ} 34'$. Bar. noon 29.67.

3d December.—At noon quite fine.

Abridged extract from the Log of the Barque WELLINGTON, forwarded by Captain BIDEN, Civil time.

30th November, 1843.—At noon in Lat. $13^{\circ} 37'$ S., Long. $84^{\circ} 7'$ E. Bar. 29.68. Ther. 82° . Wind marked E. S. E. Increasing to 2 P. M. when hove to, having prepared for bad weather.

1st December.—Wind marked East; gale increasing, noon Lat. $13^{\circ} 25'$ S., Long. $83^{\circ} 47'$ E., Bar. 29.58. at midnight and noon, Ther. 82° , sea increasing.

2d December.—Heavy gale N. E. 9 A. M. saw a Barque scudding under reefed fore-sail. Noon Lat. $13^{\circ} 5'$ S., Long. $83^{\circ} 27'$ E., more moderate, 6 A. M. Bar. 29.58.; at 10, 29.70., Noon 29.77. Sail made gradually.

3d December.—Noon, N. E. light breeze and rainy, Lat. $12^{\circ} 34'$ S., Long. $84^{\circ} 34'$ E. Bar. 29.90. Ther. 71.

Extract from the Log Book of the Ship TRUE BRITON, from London to Madras.—Capt. C. C. CONSITT.

Friday 1st December 1843.—P. M. Wind E. by S. commenced with a hard gale with occasional tremendous squalls with hail and rain. 8, wind increasing to a hurricane nearly, with a tremendous heavy sea, striking the ship severely, washing away the quarter galleries, above and below, and loosening the stern frame, causing the water to come in there rapidly and obliging us to keep a strong gang of hands in the lower after Cabins bailing continually, the lower deck completely afloat fore and aft, ship's sides and water-ways leaking

much, washed in and unshipped Larboard Cutter ; daylight, found one of the shrouds of the main rigging carried away and the wedges round both fore-mast and bowsprit worked right out ; blowing heavily at East with tremendous squalls and rain. Ship lurching and rolling heavily and shipping much water over all. The lower deck completely afloat, the water washing over the combings. No Observations.

Bar. ranging from 29.50. to 29. 60., Simp. from 29.2 to 29. 10, throughout the gale the Ther. 83°.

Saturday 2d December, 1844.—P. M. Wind E. by S. Hard gale with heavy squalls, rain and hail and a tremendous sea on ; ship being struck very heavily about the stern frame and under the Larboard main channels, the quarter galleries completely gone, the quarter deck and waist ports stove and washed out, the sea rolling in on either side in a large body ; 8 ditto weather ; 10 The gale moderating and glass inclined to rise ; midnight less wind with a high sea on, ship labouring severely, the sea striking her heavily and taking in much water on deck and below.

2d December.—Daylight found the driver-boom tossing astern. 8, wind still blowing strong with less sea ; well 14 inches ; throwing overboard 5 horses, that died from fatigue and want of air during the late bad weather ; noon moderate and fine. Lat. Obs. 12° 58' South. Long. 82° 30'. East.

I now, as in the former Memoirs, arrange the logs of the ships in tables to shew at one view the weather and winds prevailing over this great space of the ocean which, it will be observed, reaches on the 1st and 2d November, over 24 degrees of Lat. including the equator, and during 5 days with severe storms blowing on both sides of it. This is alone a Meteorological curiosity of no small interest.

Comparative Table of Winds and Weather from Latitude 15° North, to 15° South, and from 24th November to 3d December, 1843.

Date.	Name of Place or Ship.	Lat. N.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Noon. 24 Nov.	Winifred, ..	15 27 Lat. S.	87 10	NORTHERN HEMISPHERE. Steady N. E. breeze. ..	29.83	..	78	Fine clear weather.
	Flowers of Ugie, ..	5 08	84 24*	SOUTHERN HEMISPHERE. P. M. Light airs and squally to midnight.	..	..	..	Midnight heavy squalls, South.
	John Fleming, ..	4 47	84 30	Strong gale W. S. W. and W. by S. .. ..	..	..	..	Running to the Southward and under close reefs.
	Elizabeth Ainslie, ..	5 10	84 25	Fresh breeze and latterly squally W.	29.78	..	79	Standing to the Southward.
	Futtle Rozack, ..	5 32	84 49	Dark gloomy variable S. E. to S. W.	29.64	..	80	Standing to the E. by S. Tremendous high and confused sea from the Southward; wind falling and rising.
	Sophia, ..	6 30	81 20	W. N. W. to S. W. by S. squally. .. ..	..	..	..	4:30 A. M. shift S. S. E. to W. N. W. midnight 24th to 25th calm.
Noon. 25 Nov.	Carena, ..	Lat. N. 4 58	....	NORTHERN HEMISPHERE. Light air and calm. ..	..	..	..	Near the Coast of Ceylon bound to Madras. Fresh and cloudy.
	Winifred, ..	12 43 Lat. S.	86 23	N. E. strong breeze. ..	29.82	..	78½	
	John Fleming, ..	5 1	Long. E. 85 31	SOUTHERN HEMISPHERE. More moderate to midnight wind about W. S. W. ..	29.70	..	78	Strong head sea, ship steering to the Southward and Eastward.
	Elizabeth Ainslie, ..	5 41	85 40	S. W. to S. S. W. Noon S. S. W. fresh gale P. M. S. W. by S. and S. W. ...	29.78	..	80	Noon high swell from the South- ward increasing fresh gale, mid- night, W. S. W. steering to the S. E. and S. S. E.

* By account only.

Date.	Name of Place or Ship.	Lat. S.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Noon. 25 Nov. 1843.	Edmondstone, Flowers of Ugie,	6 15 5 36	82 30 85 27	SOUTHERN HEMISPHERE. Variable S. W. to S. E. light breezes and cloudy. Heavy squalls and rain, noon strong gale South and S. by W. P. M. S. W. by S.	29.80	..	81	Bar. at midnight, 29.68.
	Futtle Rozack,	5 42	85 3	Noon strong gale at inter- vals S. W. to South P. M. mostly S. W. violent squalls.	29.63	..	80	High cross sea midnight heavy puffs and lulls. Midnight moderate and squally.
	Sophia,	5 50	81 49	Variable squally and calms.	.. ..	..	..
Noon. 26 Nov.	Winifred.	Lat. N. 9 40	85 48	NORTHERN HEMISPHERE. Variable, to East dark and threatening P. M. strong heavy squalls.	29.80	..	78	
	Candahar,	8 19	84 38	Variable from N. N. E., N. by E. and N. E. by N. squalls.	29.80	..	..
	Fyzul Curreen, Carena,	7 50 5 43	83 59 ..	Steady winds N. and N. by E. Strong winds and cloudy, SOUTHERN HEMISPHERE.				
	Edmonstone,	Lat. S. 6 42	83 00	Steady light breeze to noon from S. S. W. P. M. S. S. W. to South brisk breeze,				
	John Fleming,	5 58	86 24	Every appearance of a gale, A. M. W. S. W. P. M. S. W. by W. blowing very hard.	29.50	..	..	Ship lying to under storm stay- sail, midnight blowing exces- sively hard.
	Elizabeth Ainslie,	6 36	86 53	To noon W. S. W. hard gale and midnight moderating a little.	29.65	..	80	Noon hove to, midnight under sail again.

Date.	Name of Place or Ship.	Lat. S.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Noon 26 Nov. 1843.	Flowers of Ugite,	° , 6 05	° , 86 21	SOUTHERN HEMISPHERE. Increasing gale noon; 10 p. m. wind S.W. P. M. S. W. b W.	29.62	..	°	Heavy sea, 4 p. m. hove to under bare poles. Strong to the S. E. b. S.
	Baboo, Sophia,	6 17 6 24	82 53	Wind S. W. b. S. S.S.W. to South fresh breeze and cloudy, .. ..	..	..	..	Standing to the West and W. b N.
	Fittle Rozack,	5 30	86 23	South to S.W. hove to, heavy gale and furious squalls; P. M. wind S. W., W. S. W., and West.	29.63	..	80	P. M. edging away to S. E. b. E.
Noon 27 Nov.	Winifred,	Lat. N. 7 4	85 56	NORTHERN HEMISPHERE. E. N. E. 8 P. M. North; 4 A.M. N.N.W. thick gloomy weather and heavy rain, ..	29.67 4 A. M. 58	..	78	Sudden and dangerous gusts and violent squalls giving little warning, P. M. heavy squalls.
	Candahar, Pazzelbarry,	9 5 5 38	83 50 88 40	N. E. & midnight N. E. b. E. Moderate but threatening from Eastward, P. M. in- creasing to a gale, ..	29.72	..	82	Dark cloudy weather and a heavy N. E. sea. Bar. falling and 29.65 at midnight.
	Fyzul Curreeem,	5 11	83 36	N. N. W. squally, P. M. heavy squalls N. N. W. to midnight, .. ..	..	..	..	Near the Coast of Ceylon.
	Carena,	..	..	Light airs and dark cloudy weather, winds from N. N. E. ....	..	..	..
	Edmonstone,	Lat. S. 6 58	83 36	SOUTHERN HEMISPHERE. Strong breeze South, with hard squalls and turbu- lent sea, midnight gale,	..	..	..

Date.	Name of Place or Ship.	Lat. S.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Noon 27 Nov. 1843.	John Fleming, Elizabeth Ainslie,	6 26 6 27	87 10 87 22	SOUTHERN HEMISPHERE. Heavy gale about S. W. . . Fresh gales with high sea from the W. N. W. wind N. W. b. N. N. W. 10 P. M. North, midnight N. N. E.	29.50 29.60	.. ..	80 81	P. M. Bar. 29.40; A. M. sea increas- ing. To Noon ran 62 miles to the S. b. W.
	Flowers of Ugie,	6 20	88 4	Heavy gale W. b. N. noon W. N. W. P. M. W. N. W. 10 P. M. N. W.	29.57	..	83	Lying to. Easterly set of 60' from Noon 26th.
	Baboo,	..	..	Fresh gale S. S. W. P. M. Southerly. . . . .	..	..	..	Course to the E. S. E.
	Sophia,	6 30	..	South and Southerly. P. M. to midnight hard squalls, . .	..	..	..	Heavy S. E. swell.
	Futtle Rozack,	6 38	86 53	N. W. at noon. Increasing gale, 10 P. M. North, . .	29.43	..	80	Tremendous sea, A. M. wind shif- ted from W. S. W. to N. W. ship scudding to S. E. and South; Bar. at midnight 29.49.
Noon. 28 Nov.	Winifred,	Lat. N. 4 27	85 58	NORTHERN HEMISPHERE. N. W. to N. N. W. strong gales, heavy rain, and gloomy weather,	29.65 8 P. M. 60 4 A. M. 57	..	79	Confused sea 11 P. M. most ter- rific squalls.
	Candahar,	9 15	83 45	Strong Monsoon (?) N. E. b. E. 2 A. M. veering to the Northward.	29.70	..	..	Heavy squalls and a strong mon- soon?
	Fazzelbarry,	7 22	88 10	6 A. M. N. E. Noon N. E. P. M. E. N. E. heavy gales,	29.54	..	81	Midnight gale increasing, Bar. 29.45.

Date.	Name of Place or Ship.	Lat. N.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Noon 28 Nov. 1843.	Carena, ..	0 1	0 1	NORTHERN HEMISPHERE. Fresh breezes and squally N. E. b. E. to N. N. W.	..	..	0	Off the Coast of Ceylon.
	Fyzul Curreen, ..	2 06	83 40½	N. N. W. to N. W. fresh breeze, P. M. fresh gale West,	..	..	..
	Edmonstone, ..	6 50	84 04	A. M. S. S. W., P. M. S. W. strong gale, .. ..	..	..	..	Mountainous sea, gale increasing to midnight.
	John Fleming, ..	7 7	87 24	Noon, more moderate drawing to N. W. P. M. continuing N. N. W. 8 P. M. N. E.	29.50	..	80	Ship running to the S. W. b. S. and S. W. 98' from 11 A. M. to midnight, at midnight strong gale.
	Elizabeth Ainslie, ..	8 21	87 02	Wind E. N. E. hard gale with tremendous sea, P. M. E. N. E., 6 P. M. East. ..	29.5	..	80	3 A. M. Bar. 29.30 noon hove to under close reefed main top-sail. Bore up at 5 P. M. at 6 broached to, midnight increasing. Heavy head sea from the South.
	Sophia, ..	6 23	81 34	S. by E. to S. S. W. with thick weather, P. M. S. W. to S. W. b. W. increasing,	..	..	..	Heavy gale N. E. throughout, the wind having veered to N. E. from North in a furious squall.
	Futtle Rozack, ..	7 39	87 17	Wind N. E. throughout, heavy gale and tremendous squalls and sea, .. ..	..	..	..

Date.	Name of Place or Ship.	Lat. S.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Noon 28 Nov. 1843.	Flowers of Ugie, ..	0 1	88 49	SOUTHERN HEMISPHERE. 2 A. M. N. N. W. and to midnight North, strong gales.	29.63	..	84	From 10 P. M. on 27 to 6 A. M. on 28th ran 40° to S. W. b S. but sea increasing hove to again.
	Baboo, ..	7 8	85 10	A. M. S. to S. S. W. heavy squalls, noon S. W. b W. 6 P. M. W. S. W., to mid- night strong gales. .. ..	.. ..	..	..	Ship running to S. E., S. S. E., S. b E., and S. b W.
	Winifred, ..	Lat. N. 1 20	86 30	NORTHERN HEMISPHERE. N. N. W. Veering to West, violent squalls, dark dis- mal gloomy weather.	29.59	..	81	Succession of dangerous squalls and thick weather, Bar. rising and falling.
Noon 29 Nov.	Candahar, ..	9 26	83 48	Heavy breeze N. b E. P. M. increasing rapidly, every appearance of a storm, P. M. North,	29.70	..	..	6 P. M. hove to.
	Fazulbarry, ..	..	87 20	Blowing furiously N. E. b E. Noon N. E., P. M. furious gale N. N. E. 11: 30 bore up.	29.41	..	..	Ship running to the Southward, and in great distress.
	Bittern. ..	5 33	..	S. W. Fresh gale, and squall- ly, P. M. S. S. W. and S., 10 P. M. S. S. E.	29.35	..	..	4 P. M. Bar. 29.34

Date.	Name of Place or Ship.	Lat. N.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Noon 29 Nov. 1843.	Carena,	0° ..	0° ..	NORTHERN HEMISPHERE. N. W. N. E. and W. N. W. with dark squally and threatening weather.	.. ..	..	°	Prepared for bad weather, light- ning at night. Off Ceylon.
	Edmonstone,* ..	Lat. S. 80°	83 6?	SOUTHERN HEMISPHERE. 2 A. M. W. S. W. 9 West P. M. W. by S. and W. N. W.....	.. ..	..	..	9 A. M. hove to. 10 P. M. bore up again.
	John Fleming, ..	..	86 20	Hurricane about N. E. P. M. between N. and E. ..	29.0	28.9	79	Ship buried in the sea, head to N. N. W.
	Elizabeth Ainslie, ..	8 40	85 07	5 P. M. a lull, 7 A. M. North, hurricane, noon hard puffs and lulls, 1 P. M. S. E. 6 North, 9 N. N. W. ..	29.0	..	77	A. M. boats blowing from the davits.
	Sophia,	6 48	82 0	Heavy gale commenced S. S. W. to S. W. b W. to West and W. N. W. ..	.. ..	..	..	Very dirty appearance all round. Increasing steadily to midnight, gale continuing, position by estimate.
	Fyzul Curreem, ..	0 54†	84 31	Gale from West throughout.	.. ..	..	..
	Futtle Rozack, ..	9 47	87 18	N. E. till noon blowing most furiously, P. M. N. E. to East.	29.59	..	81	A. M. tried to scud. Noon hove to again.
	Flowers of Ugie. ..	8 46	87 40	8 moderating, Noon strong gales P. M. N. N. E. 10 P. M. N. E.	29.67	..	83	10 A. M. bore up and ran to S. W. b S. 4 P. M. Bar. 29.66.

* Latitude and Longitude, estimated only.

† This is a remarkable instance of Newspaper inaccuracy, this Lat. was 8.54 in all the papers!

Date.	Name of Place or Ship.	Lat. S.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Neon 29 Nov. 1843.	Baboo,	0 /	0 /	SOUTHERN HEMISPHERE. Strong gales W. S. W. and Westerly P. M. N. W. ..	..	..	0	Vessel running to the S. W. S. S. W. and S. b. W. position from estimate only.
Neon 30 Nov	Vernon, off Madras, AT MADRAS.	Lat N. .. ..	.. .. ..	NORTHERN HEMISPHERE. Fresh monsoon, N. N. E. A. M. N. W. P. M. N. W. 8 A. M. 4 P. M. 10 P. M. .. ..	.. 30.12 29.92 39.99	.. .. ..	.. .. ..	Steering to the Eastward from Madras roads from 7 P. M. Surf very high and strong cur- rent to the Northward. 11 A. M. Terrific squall.
	Candalah, Fyzulbarry, ..	9 40 7 22	83 57 87 85	N. W. b. N. and N. W. heavy gale, 3 A. M. North gale at its highest fury, noon mode- rating, P. M. N. N. E. 5 P. M. Easterly gale bro- ken. Midnight strong breeze S. W.	29.50 29.40	.. ..	.. 82	Vessel first steering to the S. S. E. and then to N. E. with the S. W. breeze.
	Mary Imrie,	12 20	..	N. N. E. strong breeze dis- mal weather. .. ..	..	..	..	Bar. 30.3, noon 30.11, 2 P. M. 29.83.
	Bittern,	8 23	..	E. N. E. Fresh gale throughout, 1 A. M. N. N. W. strong gales, at 7 Westerly, P. M. S. S. W.	29.34	..	..	5 P. M. Bar. 29.30 and 8. 29.41.
	Carena, .. ..	..	..	..	..	..	..	P. M. wind moderating and ship making some sail.

Date.	Name of Place or Ship.	Lat. S.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Noon 30 Nov. 1843.		° /	° /	SOUTHERN HEMISPHERE.			°	
	Winifred, *	1 1	86 0	West, dismal weather and violent squalls, varying to N. W.	29.64	..	83	Barometer vibrating greatly in the severe squalls.
	Sophia, Edmonstone, ..	.. 9 3	85 4	Hard gale N. W. 3 A. M. N. W. b. N., N. W. noon, severe gale, N. N. W. 8 N. b. E.	.. ..	.. ..	.. ..	Midnight Bar. rising a little.
	John Fleming, ..	.. ..	.. ..	Hurricane between North & East. .. ..	.. ..	.. ..	.. ..	Cut away top-masts. Boats blowing to pieces.
	Flowers of Ugie, ..	10 52	86 24	Strong gale N. E. b. E., noon N. E. midnight E. N. E.	29.59	..	83	Ran to the S. W. b. S. 138' and hove to again. Bar. -2 P. M. 29.58. Midnight 29.49.
	Elizabeth Ainslie, ..	.. ..	.. ..	Wind North to noon, P. M. hurricane N. to N. N. E.	28.80	..	78	Ship on her beam ends, sails blowing from the yards, furious hurricane.
	Active, ..	10 23	85 17	Hurricane about East.	.. ..	.. ..	.. ..	Moderating from 8 A. M.
	Ward, ..	12 30	84 30	Commencing gale from S. † W. on this day.	29.61	..	80	A. M. gale abating a little, P. M. more moderate, heavy sea.
	Fyzal Curream, ..	3 50	85 27	Steady at West. .. ..	.. ..	.. ..	.. ..	Running 7 knots to the S. W.
	Futtle Rozack, ..	10 52	86 0	Hurricane N. E. throughout, abating gradually. .. ..	.. ..	.. ..	.. ..
	Baboo, ..	9 2	85 9	N. W. strong gale to midnight.	.. ..	.. ..	.. ..
	Wellington, ..	13 37	84 7	E. S. E. increasing gale.	29.68	..	82	

* This vessel was on the 29th in the Northern Hemisphere.

† Lat. probably erroneous: See Summary.

Date.	Name of Place or Ship.	Lat. N.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Noon 1st Dec. 1843.		0'	0'				0	
	Vernon,	12 5	83 29	NORTHERN HEMISPHERE. N. N. E. to noon, P. M. N. E. and midnight E. N. E.	29.68	29.52	..	
	At MADRAS,	..	..	N. W. throughout, A. M. Noon, 10 P. M.	29.984 — 877 — 953	..	..	Strong surf and Northerly current.
	At KAYTO N. E. part of Ceylon, ..	..	..	N. W. commencing about noon, .. ..	..	..	..	From noon increasing in violence till 6 P. M. of 2d.
	At DELFT Island, ..	..	..	Moderating N. W. veering to West and W. S. W. and increasing,				
	At PAUMBUN, ..	..	..	N. W. and freshening from N. E. at night,				
	Candahar, ..	10 32	84 3	A. M. heavy gale N. W., at 3 P. M. shifted to S. W., 5 N. W., 10 S. W. ..	..	..	..	Bar. at 3 P. M. fell to 29.40, noon to 3 P. M. very little wind, mid- night apparently steady at S. W.
	Niagara, ..	10 00	87 0	Hard gale, S. W. to E. S. E.	{ 7. 29.30 9. 29.45 11. 29.55 Noon 29.65 3. 29.75 10. 29.80 29.60	..	82	Midnight moderating.
	Fyzulbarry, ..	9 55	88 00	4 A. M. increasing S. S. W. gale, noon South, P. M. S. S. W. .. ..		..	..
	Mary Imrie, ..	10 4	84 1	Heavy gale about N. N. E. clearing little at noon, ..		..	..	Midnight very threatening. Bar. 29.25 wind hauling apparently to the Westward.

Date.	Name of Place or Ship.	Lat. N.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Noon 1st Dec. 1843.	Col. Burney, Bittern,	6 50 9 49	85 20 *	NORTHERN HEMISPHERE. East fresh gale, midnight about S. b. E. .. ..	.. .. 29.24 29.49	.. ..	° ..	Dismasted. Bar. 29.24 at noon to 29.49 at midnight.
	Carena,	9 51	..	Wind Southerly strong gale, 2 P. M. wind S. S. E., 11 P. M. S. E. .. ..	.. ..	.. ..	° ..	Latterly scudding under reefed fore-sail.
	Winifred, ..	Lat. S. 3 15	86 56	SOUTHERN HEMISPHERE. N. W. dark gloomy weather and violent squalls, P. M. moderating.	{ 4 A. M. 29.74 Noon — 67 8 P. M. — 68	.. ..	82	4 P. M. hove to. Moderating to midnight.
	Edmonstone, ..	11 15	84 22	Strong gales N. E. to mid- night. ....	.. ..	.. ..	° ..	4 P. M. Bar. rising.
	John Fleming,	..	..	Hurricane between N. and East. .. ..	.. ..	28.4†	° ..	Midnight heavy sea from the S. W.
	Flowers of Ugie,	11 2	86 6	A. M. E. N. E. noon N. E. b. E. Strong gales and tur- bulent sea to midnight. ..	29.50	.. ..	84	Bar. from 29.50 to 29.60. Simp. 29.2 to 29.10.
	Sophia,	9 56	81 48	Heavy gales and fearful sea, P. M. Moderating, wind N W. throughout. .. ..	.. ..	.. ..	° ..
	Baboo,	11 0	..	To noon N. W. P. M. heavy gale N. N. W. .. ..	.. ..	.. ..	° ..
	True Briton,	..	..	Blowing heavy at East with tremendous squalls. ..	.. ..	.. ..	° ..

* According to the copy of Captain Durham's letter to his owner, it was in Lat. 6° 00' N. Long. 29° E. I presume the newspaper to be right as Captain Durham might have thought it unnecessary to state more than in degrees his true position to his owners whereas to the Master Attendant of Point de Galle he might probably have given it to minutes.

Date.	Name of Place or Ship.	Lat. S.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
<div> <div> <div>Noon</div> <div>1st Dec.</div> <div>1843.</div> </div> </div>	Fyzul Curreem, ..	<div> <div>°</div> <div>'</div> <div>5 39</div> </div>	<div> <div>°</div> <div>'</div> <div>85 37½</div> </div>	<div> <div>SOUTHERN HEMISPHERE.</div> <div>10 A. M. N. N. W. Noon</div> <div>fine P. M. N. N. W. and</div> <div>N. W. to midnight.</div> </div>	<div> <div>..</div> <div>..</div> <div>29.58</div> </div>	<div> <div>..</div> <div>..</div> <div>..</div> </div>	<div> <div>°</div> <div>..</div> <div>82</div> </div>	<div> <div>Strong sea from W. S. W. and</div> <div>current of 29' to the E. N. E.</div> </div>
	Wellington, Elizabeth Ainslie, ..	<div> <div>13 25</div> <div>..</div> </div>	<div> <div>83 47</div> <div>..</div> </div>	<div> <div>East, gale increasing. heavy</div> <div>Moderating to noon. heavy</div> <div>gusts and lulls N. E., A. M.</div> <div>wind N. N. E. and P. M.</div> <div>N. E.</div> </div>	<div> <div>29.30</div> <div>to—45</div> </div>	<div> <div>..</div> <div>..</div> </div>	<div> <div>..</div> <div>..</div> </div>	<div> <div>High sea or dark cloudy wea-</div> <div>ther.</div> </div>
	Futtle Rozaek, ..	<div> <div>11 10</div> </div>	<div> <div>85 47</div> </div>	<div> <div>Gale abating, N. E. through-</div> <div>out,</div> </div>	<div> <div>29.62</div> </div>	<div> <div>..</div> <div>..</div> </div>	<div> <div>81</div> </div>	
<div> <div>Noon</div> <div>2d Dec.</div> </div>	Vernon, ..	<div> <div>Lat. N.</div> <div>11 48</div> </div>	<div> <div>83 38</div> </div>	<div> <div>NORTHERN HEMISPHERE.</div> <div>9 A. M. E. b. S. P. M. East-</div> <div>erly 7 P. M. E. S. E. and</div> <div>fine... ..</div> </div>	<div> <div>29.69</div> </div>	<div> <div>29.54</div> </div>	<div> <div>81</div> </div>	<div> <div>2 A. M. wind shifted to E. S. E.</div> <div>confused sea and much light-</div> <div>ning, P. M. moderating.</div> </div>
	At MADRAS, ..	<div> <div>..</div> </div>	<div> <div>..</div> </div>	<div> <div>6 A. M. N. W., P. M. North.</div> </div>	<div> <div>29.94</div> <div>—86</div> <div>—91</div> </div>	<div> <div>..</div> </div>	<div> <div>..</div> </div>	<div> <div>Strong North current and high</div> <div>surf.</div> </div>
	At KAYTO, ..	<div> <div>..</div> </div>	<div> <div>..</div> </div>	<div> <div>N. W. from 6 P. M. to mid-</div> <div>night blowing with great</div> <div>fury.</div> </div>				
	At DELFT ISLAND, ..	<div> <div>..</div> </div>	<div> <div>..</div> </div>	<div> <div>6 A. M. heavy gale W. b. S.</div> <div>to midnight.</div> </div>				
	At PAUMBUM, ..	<div> <div>..</div> </div>	<div> <div>..</div> </div>	<div> <div>A. M. N. N. W. freshening and</div> <div>veering to Westward, mid-</div> <div>night heavy gale W. S. W.</div> </div>	<div> <div>..</div> </div>	<div> <div>..</div> </div>	<div> <div>..</div> </div>	<div> <div>Heavy bank to N. E. but no</div> <div>wind from that quarter.</div> </div>

Date.	Name of Place or Ship.	Lat. N.	Long. E.	Winds and Weather.	Barometer.	Simp.	Ther.	Remarks.
Neon 2d Dec. 1843.	Candahar,	° ' 11 10	° ' 84 4	NORTHERN HEMISPHERE. A. M. violent gale S. W. 4. A. M. South P. M. S. S. E. E. and S. E.	{ 29.40 to 29.80	..	°	Vessel steering to the North and N. W. round the Eastern and N. Eastern quadrants of the storm.
	Fyzulbarry,	11 17	19 45	Fine wind S. S. E. to E. S. E. 2 A. M. calm, afterwards hurricane from S. S. W. ..	29.90	..	83	P. M. Bar. 29.80.
	Mary Imrie, .. ..	..	..	S. E. moderating, P. M. E. S. E. and S. E.	29.25	..	..	Midnight fine.
	Bittern,	11 21	..	Fresh gales and cloudy, P. M. wind S. E.	29.60	..	..	Midnight fresh gale.
	Carena,	12 17	..	SOUTHERN HEMISPHERE. Calms and fine, .. ..	..	..	..
	Winifred,	Lat. S. 4 21	87 34	Wind North and N. E. moderate and fine,	29.74	..	83	
	Edmonstone,	12 23	84 30	Moderate and fine N. E. ..	..	..	..	Heavy cross sea.
	Elizabeth Ainslie, ..	12 34	81 55	Moderating to noon, P. M. Wind N. E.	29.80	..	79	High swell from the North.
	John Fleming,	14 5	79 29	N. E. clearing up, .. ..	..	..	..	At midnight fine.
	Flowers of Ugie,	13 20	83 49	P. M. E. N. E.	29.83	..	86	
	Futtle Rozack,	12 30	85 30	Wind East to noon moderate,	29.67	..	..	On 3d quite fine.
	Baboo, .. ..	..	..	P. M. wind marked Easterly heavy gale to midnight ..	..	..	..	Ship steering to the W. b. S. On 3d fine, Lat. 11° 7' S. 80° 49' E.
	Sophia,	9 56	81 48	North fresh breeze & cloudy, ..	..	..	..
	True Briton,	12 58	82 30	Moderate and fine, .. ..	..	..	..	Heavy head sea.
	Fyzul Curreen,	6 41	85 01	Fine, .. ..	..	..	..
	Wellington,	13 5	83 27	N. E. moderating, .. ..	..	..	..

PART I.

SUMMARY.

Southern Hemisphere.

I have divided this summary into two parts to separate the storms of the Northern and that of the Southern Hemispheres from each other. If we review the tables, and this will be usually found the best means of forming an approximate judgment, at a glance we shall find, that,

On the 24th of November.—There is fine weather in the Northern Hemisphere with the Winifred in $15\frac{1}{2}^{\circ}$ N. and we have no other Logs for that day in Northern Lat. nearer to the equator. In the Southern Hemisphere in Lat $4^{\circ} 47'$ S. a gale had so far begun with the John Fleming as to reduce her to close reefs, but her Bar. had not fallen below 29.72: yet the thick weather, rain and heavy sea might be thought sufficient indication, that she was on the verge, at least, of the commencing storm, the centre of which must then have borne about S. S. E. to S. b. E. of her; as in the Southern Hemisphere we assume,—and this memoir will amply prove it,—that the revolution of the rotatory storms is from the South (on the left hand) to the West, North and East.

But we shall observe at the same time, that at Noon on the same day the Flowers of Ugie was, by her Log worked back from Noon of the 25th* within 12 or 15 miles of the John Fleming and yet she had but light airs, calms, and breezes from the South and S. S. W. from noon till midnight, when the weather began to be squally, increasing to a strong gale at Noon of 25th, though even then her Bar. was at 29.80.

We have then the Elizabeth Ainslie in $5^{\circ} 10'$ S. and Long. $84^{\circ} 25'$ E. or within 3 miles of the Ugie (though their logs do not mention being in sight of each other) and there are thus possibly errors in the positions

* The extract sent me begins on the 25th. Nautical time and though the Log is perfectly well and even carefully kept, it has the fault of adopting the Coaster form of marking the run per Log every two hours only; which thus always renders it in some degree obscure for purposes of after reference and exact calculation.

of all the ships sufficient to put them out of sight of each other.* This ship had also, up to noon, a fresh breeze and squally weather, and her Bar. at 29.78. the wind at West and W. b. S. and becoming more squally as she ran to the S. Eastward between noon and midnight. The Futtle Rozack was the next ship to the Southward, being in $5^{\circ} 32'$ S. and $84^{\circ} 49'$ E. on this day. As will be seen by her log, which is well worth an attentive perusal, she had indications of suspicious weather from the 21st in $1^{\circ} 22'$ S. and these were increasing every day; her weather on this day (the 24th) being dark and gloomy, with variable squalls and even calms at times, but with a tremendous high sea from the South, "the wind" lulling and coming on again with a moaning noise," her Bar. was yet at 29.64.† We have thus four ships, the John Fleming, Flowers of Ugie, Elizabeth Anslie, and Futtle Rozack, in a space comprised within 45 miles of Lat. and 25 of Long. so that allowing for slight errors of instruments and observations the whole were within less than a square degree of each other, and as we have seen they seem to have had just such variable *streams* of wind and intervals of calms or light breezes, with even fine weather, as we might suppose *a priori* to exist on the outer verge of a storm, and which those who have followed the investigations of them, both here and through Col. Reid. and Mr. Redfield's works have found in both Hemispheres. It is curious that none of the other ships remark on this day, though they do so on the 25th, upon the heavy sea, so carefully noticed in Captain Rundle's remarks; I shall advert to this again. We may thus consider the gale of the John Fleming as perhaps a commencing *stream* of wind on the circumference of a vortex, for I must again reiterate here that while of course a storm must begin *somewhere* and *somehow*, we are profoundly ignorant, both of the *how* and the *where* it begins, whether at the centre or on the circumference, and what its effects at the circumference are both when beginning and after it is in progress, and can only therefore carefully register every fact which may tend to throw the faintest light upon the manner in which these tremendous phenomena

* This however may not be the case; a Commander of one of the ships told me that there were "several of us close together when the gale commenced" and he meant *in sight*, for he remarked upon the want of preparation apparent in one or two vessels.

† Nearly correct. for its slight error of .07 was ascertained here.

first develope themselves, or are felt, at the extreme verge of their peripheries or at their centres.

We cannot therefore assign any centre for the storm on the 24th, for we have no evidence beyond the heavy swell just alluded to that it *was* fairly begun any where on that day; though it should be borne in mind that it may have been also *coming up* from a distance, and that the incipient gale of the John Fleming was perhaps an *extra-vortical* stream thrown off from the main body of the storm,* and the heights of the Bars. of the John Fleming and Ugie as late as noon of the 25th lends some countenance to the probability that the storm had formed and was really coming up. It is remarkable also that on this day the Fleming had the weather "more moderate" than on the 24th, while with the flowers of Ugie it was "a strong gale" at noon.

On the 25th November.—At noon it will be seen that these four ships the Fleming, Ugie, Ainslie, and Futtle Rozack, were all within a square space of 45 miles on each side, or as before, allowing for slight errors, all within a square degree, having made from 16 to 85 miles to the S. E. by Eastward. The Fleming was the northernmost ship, and in about 6° S., the other three nearly on the same parallel of 5.40. S. and from 85° to 85° 40' East. The Fleming as above remarked has the weather moderating considerably on this day, and this is a proof that her gale of the 24th, was as we supposed, in all probability, an extra-vortical stream thrown off from the gale into which the other three ships 40 miles to the South of her, were now fairly entered.† They had all four on this day the high Southerly sea, which may be said for the Ugie, Fleming, and Ainslie, to have begun from midnight, 24th 25th, when the Ugie marks 2 points of lee-way and she begins her preparations for bad weather also from this time. Excluding the Fleming since she was not yet fairly in the storm and taking the three other ships just mentioned to *have* been within it, we find they had all the

* The vignette titles to the Charts are purposely drawn to shew these kinds of irregularities either at the circumference or in the bodies of the storms. If considered attentively the reader will see that the arrows may curve more inwards or outwards, or be in the exact circumference of every circle, from a hundred varying causes and forces.

† Here we have an explanation of this treacherous moderating of the weather which I have often remarked upon, see "Horn Book of Storms," p. 11, and which every seaman of experience in tropical seas knows.

wind at from between South to S. S. W. and S. W. those which had it steadiest and were furthest to the Eastward, i. e. nearest to the centre, which are the Ainslie and Ugie, having it between South and S. S. W. so that we may call it almost S. b. W. on the average, which would give the centre bearing at noon E. b S., from the centre of the triangle formed by them, at any distance we may suppose; but it is barely possible to assign this, as we know nothing of the general sizes of the vortices in the Southern hemisphere or of this one in particular. We may notice also that to this day the two ships Edmonstone and Sophia which were, though in about the same Lat. three or four degrees to the West of the others, had nothing but variable light breezes, and fine weather.

On the 26th November.—We have still the same four ships near each other, though somewhat more dispersed; two, the Futtle Rozack and Ainslie, being at 73 miles from each other and the other two about midway between them, the whole four had severe gales and by noon, the Fleming was lying to under storm stay sails; the Ugie under bare poles at 4 P. M. and the Ainslie also hove to at noon. These three ships had the wind between W. S. W. and S. W. The Futtle Rozack, the northernmost ship, having it about S. W. at noon, though as she was running away to the S. E. b. E. she found it drawing more Westerly. Taking a spot in the middle of the acute rhomboid formed by their four positions,* which will only differ 35 miles at farthest from the two most distant from each other, and this in the line of the perpendicular, we shall find it to be in Lat. $6^{\circ} 5' S.$ Long. $86^{\circ} 30' E.$ and if we take it that here the average wind was really S. W. b. W. $\frac{1}{2}$ W. we shall have the centre bearing from us S. E. b S. $\frac{1}{2}$ S. and we may perhaps assume that the distance of it did not exceed from this spot 150 miles, which would place it as I have marked it in Lat. $8^{\circ} 17' S.,$ Long. $87^{\circ} 45' E.$ It was not *much* more than this distance, for the Sophia and Edmonstone which were about 220 miles due West of these four ships, had still fine weather with a brisk S. S. W. and Southerly breeze at noon in this day and the Baboo, as nearly as we

* This, when the positions of vessels do not afford cross bearings by the perpendiculars from their tangents is far the safest and must be the most correct method, particularly if we take into account how ill the exact positions can be ascertained in such weather and with how little exactitude the direction of the wind also is noted in most logs.

can judge from her Lat. and Long. was in Long. $83^{\circ} 40'$ E. Lat. $6^{\circ} 17'$ South or about 180 miles also to the Westward, standing close hauled $4\frac{1}{2}$ knots to the S. E. b S. with the wind at S. W. b S. but with only squally and rainy weather, whereas had the storm been of much larger dimensions, that is if its centre was at any much greater distance from the mean point between the four ships already noted above, the Baboo must now have felt it more severely. Hence 150 miles is certainly the utmost semi-diameter we can allow to the storm on this day, supposing the circle to be fully formed.

27th November.—The positions, of the same four ships, again form a triangular figure, of which the longest diameter from W. S. W. to E. N. E. is 75 miles and the perpendicular about 20. Three of them indeed, the Fleming, Ainslie, and Futtle Rozack are so placed that their mean distance is but about 18 miles, and I take this spot, Lat. $6^{\circ} 32'$ S. Long. $87^{\circ} 13'$ E. to be the *average position* of those three ships. Their winds as marked in the logs are ;

Elizabeth Ainslie about N. W. b W.

Fleming about W. N. W.

Futtle Rozack N. W.

N. W. b W. is thus about the mean of their winds and the Ugie we find had it W. N. W. Projecting these for the supposed bearing of the centre S. W. b S. and S. S. W. it will give us two *diverging* lines, not an unfrequent case where ships are near each other, the weather severe, and the wind not probably “filled up,” (if marked at all in the log) till a day or two afterwards.* To the Westward we have the Edmonstone and Baboo with apparently *streams* of winds from the South and S. S. W. and a sea from S. E. such as might be expected on the Western verge of a gale, and exactly analogous to those experienced by the Ainslie, Ugie, and other ships on the 25th when on its Northern verge; and those ships Edmonstone, and Baboo, were also standing on the starboard tack to the E. S. E, so as to run towards it. The Sophia, a degree farther to the Westward, has the S. E. swell but less wind.

* This is no exaggeration, as every one who knows what the severe and anxious duties of the master and officers of a merchant ship, under the present economical systems of sailing them, become in bad weather will fully admit; and we must add here that most of our ships had Lascar crews and Coolies on board. I do not then it will be understood, make the remark in the text disparagingly, but as necessary to put the reader in full possession of the facts and the grounds of my judgment.

We must therefore, as the gale had not yet reached the Baboo, which ship is the nearest, and at about 150 miles from the Futtle Rozack, Ainslie, and Fleming, conclude that it did not much exceed 100 miles in its semi-diameter, and taking this distance on each bearing line and then the mean point between the two, we obtain a spot in Lat. $7^{\circ} 50' S.$ Long. $86^{\circ} 52' E.$ for the *approximate* place of the centre of our storm for the 27th, but we shall find on the 28th that this very nearly approaches what *must* have been its true place as shewn by the veering of the winds, as the ships running and drifting to the S. S. E. sailed *close round* the centre, which was slowly moving to the N. W.

On the 28th of November.—We find on this day three of our ships the Fleming, Futtle Rozack, and Ainslie, nearly on the same meridian, but with a difference of 75 miles in Lat. between the Fleming, the northernmost and the Ainslie the southernmost ship, all having run or drifted, as the wind veered with them, to between the S. S. East and S. b. Westward, and the hurricane having been stationary or passed very slowly to the N. Westward, judging from its approximate track already laid down. Now *if* the circular theory be true, and if there *was* this progressive motion we ought to find that these ships have brought the winds from N. N. W. to North and N. East, according to their positions on various parts of the circle, having run or drifted, as before said, round the N. Eastern and Eastern, and one of them, the Ainslie, reached the S. Eastern quadrant of the storm circle. We have accordingly at noon.

The Fleming with the wind.	{	More moderate and drawing to the N. W.* P. M. N. N. W. and as the ship was running to the S. W. at 8 P. M. N. East.
The Futtle Rozack.	{	Wind N. E. throughout, having veered from North with tremendous sea, her course nearly parallel to the track of the storm.
The Ainslie.	{	N. E. hard gale, tremendous sea. P. M. E. N. E. 6 P. M. East.

While the *Ugie* from 80 to 90 miles to the Eastward of these ships has the gale first from N. N. W. but by running to the S. W. b S. brings it to North: all this is, as will readily be comprehended in exact con-

* I suppose it to be about N. W. b. N.

formity with our law of storms for the Southern Hemisphere ; and to the Westward we have now moreover.

The <i>Baboo</i>	{ With wind from S. to S. W. and at noon S. W. b W. and at 6 P. M. W. S. W. strong gale.
The <i>Edmonstone</i>	{ With strong gale and mountainous sea wind about S. S. W. veering to S.W. after noon.

which are also about the winds which ships entering the storm on its western quadrant should have. The *Sophia* is yet too far to the Westward to feel much of the storm. Taking all these data we find that the nearest spot which will reconcile them, within either a few miles of their position as given or calculated, or within a point or more of the direction of the wind,* is one in Lat. $7^{\circ} 18'$ S. and $86^{\circ} 45'$ E. where I have therefore placed the *approximate* centre of the storm for this day.

On the 29th November.—The positions of the ships are now becoming, it should be recollected, very uncertain from the continuance of the bad weather, and thus any estimation of the true place of the centre of the storm from their supposed places at noon, becomes more and more difficult. Nevertheless if we take a point near the calculated place

* I use here these words, intentionally, and as writing for unprofessional as well as professional men, and anxious that not only all our data, but also all the *considerations* which would influence the mind of a scientific seaman in considering what weight he would give to these data, should be known to all. It occurs to me that I may usefully set down here, what considerations must be taken into account in considering log-book relations of storms. The seaman is acquainted with most of them, but some may be new even to him. The data are first the ship's place, second the direction of the wind, third the run or drift, fourth the sea, these are influenced by,

- 1 Want of observations.
- 2 Bad observations set down as good ones.
- 3 Run or drift ill kept or badly estimated, few ships marking their lee-way for instance, and some being much more lee-wardly than others.
- 4 Storm wave, } See 8th Memoir, Jour. As. Soc. Vol. XII. p. 397 for the ex-
- 5 Storm current, } planation of these terms.
- 6 Wind carefully or carelessly noted ?
- 7 Not noted at all till a day or two after the storm ?
- 8 Veering of the wind set down at the wrong hours.
- 9 Alterations of courses also set down wrong, or at wrong time.
- 10 Inaccuracy of all data from errors of copyists or printers ; the last almost continual in Newspaper accounts.

of the Elizabeth Ainslie which ship must have been close to the centre at noon, for she was *in* it at 5 p. m. on this day, we shall find, that it agrees so far as to make the following ships have the winds by the chart and by their logs as follows:—

Wind by Log. Wind by the projection.

Elizabeth Ainslie, ..	about North. ..	Assumed correct.
John Fleming, ..	between N. and E.	N. $\frac{1}{2}$ E.
Flowers of Ugie, ..	about N. b E.	N. $\frac{1}{2}$ E.
Futtle Rozack, ..	N. East. ..	N. N. E. $\frac{1}{2}$ E.
Baboo, ..	Westerly. ..	W. by N.
Edmonstone, ..	West. ..	West.
Sophia, ..	about W. S. W.	S. W. by S.

which is near enough for these seven ships to allow us to assume it. It will then be for this day in Lat. $8^{\circ} 38'$ S. Long. $85^{\circ} 00'$ E.

On the 30th November.—We find that a number of the ships which had drifted or run to the South and South Westward, were evidently on the Eastern and South Eastern and Southern quadrants of the storm, having the winds from N. by E. to N. E. and East, while others were on the Northern, and the Sophia on the extreme North Western verge. The Edmonstone which ship had run down about a degree and a half to the Southward, (S. S. E. South and S. S. W.) had the wind also veering as it *should* veer with a Hurricane slowly progressing to the Westward, while she was running partly round the N. Eastern, and towards the Eastern quadrants of it; and her Bar. also was falling from midnight of the 29th to 30th, as by bearing up, she run down again towards, and neared the centre. We find it again rising also when, having brought the centre of the Hurricane to bear W. b N. of her (wind N. b E.) towards midnight of the 1st December, she again heaves to and allowed the storm to pass slowly away from her, while she drifted away from it. The following will be found the directions of the wind as given in the ship's logs and those which the centre of the Hurricane, as assumed* for this day, and the positions of the ships give at Noon.

* I use this word "assumed" rather in contradistinction to "shown" or "demonstrated" because of the great uncertainty of many of the ships' positions, of which some have now been three or four days without observations and keeping a very indifferent note of the drift, sea, and even of courses, and winds.

Wind by the Log. Winds by their positions on the chart.

Edmonstone,	N. N. W.	N. N. W.
Flowers of Ugie,	N. E.	N. E.
Futtle Rozack,	N. E.	N. E.
Active, *	about East	E. N. E.
Baboo,	N. W.	N. b. W.
Wellington,	E. S. E.	E. $\frac{3}{4}$ S.

The Ainslie and John Fleming's positions are both utterly uncertain on this day, though both ships were doubtless from the violence and veerings of the wind with them, close to the centre; no sort of account indeed could well be kept in these ships as from stress of weather, they were obliged to steer various courses so as to ease the vessel as much as possible, on account of their cooley passengers. The Ward from the imperfect newspaper account appears, though a degree or more to the North of the Wellington, to have had it at S. W. commencing on this day, though her position is quite uncertain,† as the Lat. and Long. given, as in the case of the Active, seem to have been intended to express the spot where they had the heaviest weather and not the ship's place.

The log of the Sophia offers a considerable anomaly. By the position of our centre from which she is at 180 miles distance, which is much less than the distance of the Wellington, and about the distance of the Futtle Rozack and Ugie from it, she should have the wind at S. W. while she has it at North W. by her log! I am unable at present to reconcile this. It may be an error in copying, or it may be that she met with another and a new storm thrown off in advance of the principal one, or finally she may have been carried much further to the Eastward than she supposed, and thus have been really on the N. Eastern quadrant as her wind would place her. I leave it therefore for the present.

* This vessel's place is also uncertain, for the Lat. and Long. given in the newspaper appear to be that of the ship when the storm was at its height, rather than that of a given date.

† The position is wholly wrong. The Ward spoke the Sophia on the 26th in 6 $\frac{1}{2}$ S. and therefore could not be on the 30th in 12. 30, So, both having Southerly winds. She was probably on this day somewhere between the Sophia's and Baboo's tracks which would give her the S. Westerly gale mentioned.

On the 1st December.—We have the Flowers of Ugie and Futtle Rozack close together with a heavy gale at N. E., and the Edmonstone also, which ship had run to the Southward about 150 miles, making but little westing, was now nearly on the same parallel, but 90 miles to the Westward of the two former ships, also with a N. Easterly gale. This places all three ships *on the S. E. quadrant* of the storm circle; and we have the Fleming with a hurricane between North and East “and the Ainslie with puffs and lulls from the N. E.,” indicating that both were not far from the centre and also on the same quadrant. The Fleming appears to have run in company with the storm for some time, and as the Ainslie was hove to, we see by her rising Bar. that it was, by her drift, rapidly passing from her. The track laid down for these two vessels it will be remembered is merely *a line to join the two points* between the 29th November, and 2nd and 3rd December, their position being wholly uncertain between those dates. The Baboo and Sophia both mark winds at N. W. but the positions of both are very uncertain. Hence we may I think place the centre of the storm for this day about in Lat. $9^{\circ} 35' S.$ and Long. $83^{\circ} 42' E.$ and it will give the winds to the ships as follows:—

Ugie and Futtle Rozack about, ..	N. E. by E.
Ainslie and Fleming's positions } wholly uncertain,	N. Eastward.
Edmonstone,	E. N. E.
Wellington,	East.

which with the exception of the Edmonstone is not far from what they had. For the position of the Baboo, we have only her Lat. which however would undoubtedly place her on the N. E. quadrant and therefore give her a North Westerly wind. The Sophia (or her position) is an anomaly which I must leave as I find it. She has by the position given, and with our centre, the wind a little to Southward of West, but by her log as marked she had a heavy *North* Westerly gale, she may have again been farther to the Eastward than she supposed for she could have had no good observations for the preceding 3 days, and this as before remarked would place her on the right quadrant of the circle for a N. Westerly gale, I have however, marked a storm arrow through her supposed position for this day.

On the 2nd December.—We have the Futtle Rozack, Edmonstone,

Ainslie, and Fleming, all not far from the same parallel of Lat. but dispersed over four degrees of Long. The Fleming (position uncertain) being the Westernmost, and Fittle Rozack farthest to the E. We have the Ugie also about a degree to the Southward of them, and the weather is fair, or clearing up fast with a fair Easterly breeze, for all these ships by noon on this day, as being on the S. E. quadrant of the storm, had run or drifted out of it; and had no doubt now a part of the usual trade wind. The Sophia is found on this day in about the Lat. of the centre of the 1st, and she has the wind at North, at noon, *from a heavy gale at N. W.* on the preceding days, shewing evidently that her storm could not have been the same as the one we have been considering, *i. e.* that of the Fittle Rozack, Ugie and other ships. She notes also, that at midnight between the 1st and 2nd there was a heavy sea coming up from S. W. which was in all probability the sea from the Ugie's storm, to judge by the positions of our circles.

PART II.

Storms in the Northern Hemisphere.

25th November.—In the Northern Hemisphere we have nothing extraordinary for this day, the Carena off Ceylon having light airs and the Winifred in the middle of the bay in Lat. 13° a fresh monsoon with an average Bar.

26th November.—The Winifred, Candahar, and Fyzul Curreem, have winds and weather indicating a change, though there is nothing sufficiently pronounced to be called, as yet, the commencement of a storm, and the Bars. of both the Candahar and Winifred are high.

27th November.—We have three ships, the Winifred, Fyzulbarry and Fyzul Curreem, each with signs of the approaching storm, which was afterwards so severe with the Fyzulbarry, (and perhaps the *Colonel Burney*?) The Winifred in Lat. 7° 4' N. and Long. 85° 56' E. at noon is running rapidly to the South, the wind veering from E. N. E. at noon to North at 8 P. M., and N. N. W. at 4 A. M. with thick gloomy weather and violent squalls, "giving little warning" says Captain Webb; an apt phrase to designate squalls *thrown off* from the periphery of a rotatory storm, if they were such.

The Fyzul Curreem in Lat. $5^{\circ} 11' S.$, but in Long. $83^{\circ} 36' E.$, or two degrees farther to the Westward has squally weather from N. N. W. and the Fyzulbarry in Lat. $5^{\circ} 38'$ and in $88^{\circ} 40'$ East, has it threatening from the Eastward with a heavy N. E. sea, her Bar. falling, and p. m. the wind increasing to a gale from E. N. E. with a heavy sea. We may thus assume that with this ship, at midnight, a storm had fairly begun from N. E., at which we find it marked at 1 A. M. on the morning of the 28th; at what distance we have no means of judging. I have therefore for this day marked but a single segment of a circle through the Fyzulbarry's position, from a centre 240 miles due S. E. of it, which is to be taken rather as an *indication* of the storm than any thing else.

On the 28th November.—We have the Winifred in $4^{\circ} 27' N.$ and Fyzul Curreem in $2^{\circ} 06' N.$ the first with “strong gales N. W. and N. N. W. and gloomy weather with her Bar. falling a little, and the latter with only a fresh breeze from about N. W. The Fyzulbarry had her N. Easterly storm continuing and veering to E. N. E. It is probable that as the Winifred and Fyzulbarry were only 220 miles apart on this day, the Winifred was just on the outskirts of the storm which evidently lies betwixt them; and as she was running to the Southward she soon got clear of it. The Fyzul Curreem was wholly out of its influence and the Candahar has, as yet, but a strong monsoon gale. I have therefore placed the centre of the Fyzulbarry's storm in Lat. $6^{\circ} 00' N.$ Long. $88^{\circ} 45' E.$ marking an arrow through the Winifred's position to shew its effect upon her.

29th November.—We have the Candahar with an evidently *commencing* gale at N. E. and the Fyzulbarry with a furious one at N. E. We have no other bearing or datum whereby to estimate the distance of the centre of this storm which now bore about S. E. from the Fyzulbarry, but we find that it veered rapidly with her to N. N. E. and by 11: 30 p. m. to North; of course as the vessel ran and drifted round the N. W. quadrant. From the best estimate I can make, I should with every allowance place the centre, which bore at noon S. E. of this ship, in Lat. $6^{\circ} 52' N.$ Long. $87^{\circ} 48' E.$ * We have no Lat. of the Carena, and of the Bittern *only* a Lat. of this day!

* It was really in about $6^{\circ} 00' N.$, Long. $88^{\circ} 00'$ East, by the Log of the John Brightman. See note at the end.

I have printed the abridgment of these extracts, indeed, almost to shew what meagre and disappointing documents we sometimes obtain.* We cannot from such data affirm that the Fyzulbarry's and Candahar's storms were the same, and indeed the great size of this circle is entirely I think against the probability that they were, for it would be if completed 600 miles in diameter, and we shall find on the 30th and 1st December that the storm *could* not have been the same, and we thus obtain distinct evidence of three separate storms at the same time; two in the Northern and one in the Southern Hemisphere.

30th November.—We have first the Fyzulbarry running to the S. S. E. and S. E. and evidently towards the centre of the storm, which does not appear to have been an entirely calm one or at least the ship did not get into it. At 7 P. M. she had the Westerly sea, “rolling up and overpowering the Easterly one,” and the S. W. and Southerly gale coming up. She had an observation, though indifferent on this day, so that we may take her position as within a little to be that of the centre of the storm, and projecting it would give to Candahar a N. *Easterly* gale at 250 miles distance from the centre; and therefore a moderate, instead of a furious N. *Westerly* one which she had,) shewing that her storm as before remarked, was certainly a different one from that of the Fyzulbarry. I have then placed the centre of the Fyzulbarry's storm for this day in Lat. $7^{\circ} 30' N.$ Long. $87^{\circ} 30' E.$ The Mary Imrie in $12^{\circ} 20' N.$ though we have not her longitude this day, was doubtless on the N. W. quadrant of the Candahar's storm, and at Madras the high surf and strong current to the Northward are indications of the approaching tempest there. The Vernon we find went to sea, on this day from Madras roads, with a fresh N. N. E. gale at 7 P. M. The Bittern and Carena's logs give us no information for want of Long. but the Winifred's is interesting as showing that though the

* And, as it has often struck me, to remark on the absurd practice of keeping a log book without entering the Longitude. It is quite possible that a case might arise in which, at least ignorance of his position, if not of wilful destruction of his vessel might be alledged, if not proved, in a court of law against the master of a vessel through this omission; and his insurance thereby become vitiated in case of an accident. The private “Chronometer book” of a Captain would barely be called a legitimate document when the book which *should* contain the vessel's place at noon is blank.

centre of the Fyzulbarry's storm and that of the ships in the Southern Hemisphere were sixteen degrees of Lat. apart on this day, there was still about the equator considerable atmospheric disturbance, with heavy streams of wind from the Westward, agreeing with what we should look for as the general effect of the Southern and Northern halves of the storms in each Hemisphere. The Winifred's Bar. also, and it was evidently most carefully observed, is yet about two tenths below the averages before and after the bad weather which she experienced. At *midnight* of this day we have the Candahar with a heavy gale at N. W. and the Mary Imrie with a terrific one at N. N. E. and taking the last ship to have made about a South course, we find by projection that on the 30th, at *midnight* the centre of what I shall now on this evidence call the Candahar's storm was in about Lat. $10^{\circ} 45' N.$, Long. $65^{\circ} 0' E.$, the centre passing near the Candahar about noon the following day; the Mary Imrie scudding to the Southward on its Western side.

1st December.—We have first the Fyzulbarry, which ship had run with her Southerly gale 150 miles to the N. N. E. from noon 30th to noon of this day with the winds between S. S. W. and South, raising her Bar. as she increased her distance from the centre of the storm from 29.30, at 7 A. M. to 29.80 at 10 P. M. or half an inch in fifteen hours; and obtaining also moderate weather at midnight. I have before shewn on the 29th and 30th November that this ship's storm must have been a separate one from that of the Candahar, and it will be presently seen that it clearly was so. The loose report of the Niagara informs us of nothing more than that she had a rotatory storm *about* in Lat. 10° Long. 87° of which we may suppose the strength was *about* noon on this day, and that she was not far from the centre of it; drifting or running round the S. Eastern and North Eastern quadrants of it, if indeed the expressions used do not mean that she had a shift of wind; she would then at all events, if not in the centre, be on the Eastern side of it; so that taking the Fyzulbarry's and this to be the same storm we find that it may have travelled up to the N. b. Westward about 150 miles, or something less, in this 24 hours, and to this the run of the Fyzulbarry 150 miles to the N. b. E. *but carrying always a Southerly wind*, lends much probability. However the Niagara's position and times of the wind, &c. are so loosely given

that we can only mark this as an approximation. Her rapid change of wind, however, and her distance from the Candahar on this day, which was nearly, or quite, three degrees of Long. exclude the idea of its being the same storm, and I have placed its centre, approximately, close to the Niagara in Lat. $9^{\circ} 55'$ N. Long. $86^{\circ} 55'$ E.

We now come to the Candahar, Mary Imrie and Vernon on this day, and here we must first remark on the Candahar's position which must be I should think erroneously given,* for she was lying to with a tremendous heavy gale from *North Westward* veering at one time to N. by E. and again to N. W. by W. and yet she has made nearly a Northerly course! This is of course impossible, unless we suppose her to have been carried as far to the West by the storm wave as she was drifted to the East by the wind and storm current, both of which tended to carry her to the East and E. S. E. and her position indeed on this day can but be an estimated one: I did not observe this at the time I made the extract, and there may be some clerical error of my own. It is now too late to rectify it, and we must therefore allow that one way or the other there is an error between these two days. The Vernon's position was certainly correct but then she had only a "strong breeze" with her Barometer at 29.68. and we cannot thus allow her to have been *in* the storm though close to the outskirts of it. The Mary Imrie was running free and had an observation, so that her position may be taken as nearly correct, but we have unfortunately the wind but loosely given as veering "to the *Westward*" (from the N. N. E.) after noon. We may guess it to have been about North or to the Westward of it, *at* Noon which placing the Candahar, somewhat further to the Eastward, if we please, will give us a spot in about Lat. $10^{\circ} 18'$ Long. $84^{\circ} 2'$ E. as the approximate position of the centre of this storm on this day which was evidently passing the meridian of these ships and close to the Candahar, and this apparently on a track to the Southward of West.

The difference of their positions indeed is but 28 miles, an error which might easily occur with the Candahar, having no observation. The repeated shifts of wind from N. W. to S. W. may be accounted for very simply, by reflecting that when near to or in the central space, there are many causes such as irregular blasts, storm wave and cur-

* Or that of the day preceding may be so ?

rent,—the ship's own run or drift &c.—to induce these irregularities; and we find that as the centre passed on and she fell into the S. Eastern quadrant of the storm, she again experienced it blowing a hurricane from S. W. shewing that (as she had run a little to the North) she had been on the Southern side of the central space; of whatever extent this was. It is indeed I think most probable that on this day she was not to the Northward but the *Southward* of the Mary Imrie's position. Both ships were probably very near to, though they did not see each other. The Vernon's position gives a radius of 110 miles, or a diameter of 220, for this storm for this day, and we are satisfied that it could not be the Niagara's or Fyzulbarry's, the Niagara being evidently close to the centre of hers. I shall remark on the 2nd, on the Madras and Ceylon reports for this and the next day.

On the 2nd December.—We find that the Mary Imrie on this day while running down say about 80 miles* to the South and South Eastward, before a terrific hurricane veering from the N.N.E. to the N. Westward, had her Bar. always falling, and was at 2 A. M. in another, and of course a *different* centre from that of the Candahar's storm of the day proceeding, for she was now perhaps 100 miles from that ship, This centre gave her another hurricane at S. S. W. and Capt. Boyd's description of the sea is exactly what we should suppose the effect of a second storm passing over any part of the sea left by one just preceding it to be. I think it most probable that this second hurricane may have been the Niagara and Fyzulbarry's storm and have so marked it; supposing the Mary Imrie to have been in Lat. $9^{\circ} 20'$ and Long. $85^{\circ} 00'$ and the centre a little to the Westward of her.

The Candahar, on this day had run to the North and N. W. round the Eastern and North Eastern quadrants of her storm, while the Vernon, which ship had stood to the E. S. E. with the N. Easterly gale of the preceding day, had a smart shift of wind of four points, as the centre approached her, and a fall of 0.14 in her Bar. As the storm however passed to the South of her, and she was bound to the Northward, she was soon out of its influence. We find also on this day that a Westerly and N. Westerly storm prevailed at the stations on the North end of Ceylon. To obviate confusion, I have preferred consi-

* We must take this by guess having no log of the distance.

dering the reports from Madras and Ceylon, for the 1st and 2d together.

First, in reference to the general effects of the storm on the Coast: we shall observe on inspecting the chart, that there are at least two storms on this day, the Mary Imrie, Niagara and Fyzulbarry's being one, and the Candahar's another, travelling up on a N. Westerly course more or less curving, apparently to the Westward, as they approach each other,* and this bending by the way is a very remarkable feature. The average distance of the centres of the two storms from the coast we may call about $3\frac{1}{2}$ degrees. The *Candahar's* storm we know to have been of very small extent (taking her position on this day as correct) as it is determined by the *Vernon's* which is certainly exact within the trifling distance arising from the defects of all observations in bad weather. The Mary Imrie's storm we have admitted to be the Niagara's on this day, and we shall find that this projected will bring the *circumference* of her storm to within two degrees of the North end of Ceylon, and that the joint effect of both vorticæ would be to create a Northerly, and N. Westerly wind, stream, or gale if their influence extended so far; and they ought moreover to create a Northerly and N. Easterly stream at Madras. Now we know that at Madras which is as far to the N. W. as Kayto and Paumbum are to the West, and W. S. W. of the centres of the 1st and 2d, there were also the indications of an approaching storm in the increasing surf and slight fall of the Bar.† as well as the *North* current, (see remarks on Capt. Biden's report,) and that the wind was from the North and North East on the 2d, and to 4 A. M. on the 3rd, changing afterwards to S. E. From the effects of the ranges of hills (and even mountains) between Madras and the north end of Ceylon, it is impossible to go farther than to indicate generally what the average effects of a storm would be, as every separate spur and range would produce necessarily some local effect. On the coast we have the effects of the storm current in the "North current," and we have finally within these three days:—

* The Colonel Burney's storm *may* have been a third for anything we know, and it may be to it, that the Logs of the Carena and Bittern relate.

† I should consider this *slight* fall of the Bar. as some evidence in favor of the relation of the two storms and their bending to the Westward which I have supposed.

1st, 2d and 3rd Nov.—The Bar. first falling, then about stationary, and lastly rising again to its former level as if it had just felt the storm, but no more. The indications at Ceylon on the 2d are clearly those of a storm passing over the South extremity of the Peninsula, and probably, if we had any reports from Tranquebar or between it, and point Calymere we shall find that there really was a *shift* thereabouts, while the rapid veering at the station of Paumbum was taking place. It is possible that the tendency of the whole aerial impulse, like a storm or tide wave, was as usual, to force its way through the Paulgatcherry pass, as shewn in my eighth Memoir.

I must not conclude this part of the summary without noticing the remarkable fact of the Mary Imrie's Bar. remaining so high, though fluctuating greatly, in the first storm; and in the second falling to 29° 25. It will be noticed and for the present I should suppose this is the cause of this anomaly, that she was at the time her Bar. stood so high, in the N. West quadrant (having the wind at N. N. E.) of her first storm, and she had thus both the effect of the verge of the coming storm which sometimes and perhaps always, raises the Bar.* and also that of the monsoon from the N. Eastern part of the Bay. The Ariel's storm in my sixth Memoir, Vol. p. 686 of Journal is another instance in which this seems to have occurred with two storms coming up in different directions and both at a considerable angle to the monsoon. We find from the Vernon's log that it *was* blowing a fresh monsoon from the N. N. E. on this day. The oscillation I have frequently remarked upon, and if Capt. Boyd had had a Sympiesometer on board, no doubt the warning would have been still more distinctly given.

Extract from the Log of the Ship EMILY, Captain ANDERSON from Shields to Calcutta, reduced to Civil Time.

The following log reached me after the chart was lithographed; it will be seen by it that the Emily was skirting the Fyzulbarry's storm to the Eastward on the 27th and 28th, as the Winifred was to the Westward. From the heights of the Emily's Bar. we may infer that she had really no part of the vortex but rather a heavy monsoon

* See Col. Reid quoting Mr. Redfield's explanation of this phenomenon. Second edition p. 514 to 519.

setting in, though on the 27th she is near enough to the Fyzulbarry's place to allow us to suppose that both were partaking of the strong Easterly stream of wind which prevailed thereabouts on that day.

The Emily was on the 6th November 1843, at noon, in Lat. $3^{\circ}40'$ N. Long. $91^{\circ}34'$ (to $54'$ by Lunars) East. Bar. 30.5 Ther. 85° , standing to the N. N. E. with variable N. N. W. to N. W., and N. Easterly breezes to midnight.

27th November.—Increasing breeze N. E. b. E. to noon, when Lat. $5^{\circ}28'$ Long. $91^{\circ}46'$ and $92^{\circ}6'$ * Bar. 30.5 Ther. 83° P. M., strong breeze East and sudden squalls. Ship standing 6 and 7 knots to the N. N. W. and N. $\frac{1}{2}$ W. Midnight the same, and increasing with incessant rain.

28th November.—A. M. Thick cloudy weather, continued rain and heavy squalls. Wind 2 A. M. E. S. E.; at 6 East. Noon Lat. Obs. $7^{\circ}42'$ N., Long. $91^{\circ}38'$ E. Bar. 30.5 Ther. 81° P. M. Increasing breeze and a high confused sea, wind E. b. N. Midnight heavy squalls.

29th November.—A. M. strong gales East with tremendous squalls and a continuance of heavy rain, 8 A. M. wind N. E. b. E. Noon Lat. Obs. $10^{\circ}17'$ Long. $91^{\circ}3'$ + $91^{\circ}40'$ by 8 P. M. finer; out all reefs. Wind N. E. b. E. and N. E.

30th November.—Increasing again from the N. E., noon Lat. $14^{\circ}13'$ N. Long. $89^{\circ}40'$ E. Bar. 70.00 Ther. 83° P. M. hard gales East to N. E. with tremendous heavy squalls and a high confused sea. Midnight, wind E. b. N. more moderate.

1st December.—A. M. Variable weather with squalls, wind about E. N. E. Lat. $14^{\circ}13'$ N., Long. $89^{\circ}44'$ Bar. 30.10. Ther. 83° P. M. squally and torrents of rain. Wind about E. N. E.

2d December.—Moderate from N. E. Lat. $15^{\circ}35'$ N. Long. $89^{\circ}22'$ E.

Concluding Remarks.

One of the first peculiarities which strikes us in considering the storm in the Southern Hemisphere, is its almost stationary character,

* The several Longs. apparently Lunar brought on by Chr.

† $91^{\circ}30'$ is probably meant here, giving a mean Long. of $91^{\circ}35'$ for the ship's place.

as compared with the storms we have been accustomed to consider.

We find it moving only, Miles.

From the 26th to the 27th Nov. 60

27th „ 28th „ 32

28th „ 29th „ 135

29th „ 30th „ 47

30th „ 1st Dec. 57

Or in five days, 331

Giving an average of per *Day*, .. $66\frac{1}{5}$

Or per *hour* not more than $2\frac{3}{4}$

and this also on a singularly curved track.* This slow motion of the storms here, if future researches should show it to be usual, will be a new and curious fact, and will explain, not the frequency of their occurrence hereabouts, but the frequency of their being met with in the track of the outward-bound ships and on the verge of the trade.†

With respect to the track itself; we have, I think clearly established that it must first have moved up from the S. E. to the N. Westward and then curved away to the S. W. The exact position of the ships, is of course liable to great errors after three, four, or five days of bad weather or hurricane; but still these errors are reducible to moderate limits, and when we have ships on both sides of the storm, or ships on one side and others at or close to the centres, we are very sure that our positions for these points from day to day cannot be very far wrong; and certainly not far enough to invalidate our general conclusion as to the extent of the space passed over by the storm in these five days.‡

There are some other matters worthy of note which I take here

* The true track was in all probability a sharp curve passing near the different points.

† Col. Reid remarks p. 241 that the Albion's storm was apparently almost stationary or forming.

‡ See postscript for an extraordinary confirmation of the truth of our work, and of these remarks, which were written months before the intelligence there given reached me.

in their natural order to direct the attention of future observers to them, and these are:—

Atmospheric signs indicating the approach of the storm. The most remarkable of these is the warning noise noticed by Captain Rundle p. 32, to which I have there appended a note referring also to Journal Vol. XI. p. 1000 for another instance where it was carefully noted, and I have heard it also on other occasions; though not noting it on the spot I will not refer more particularly to them. It is exactly that sort of noise which we hear, and read of, in old houses in England, and with which most of us are acquainted; but we there attribute it to the noise of the wind in the chimneys, or amongst the trees, or, on board a ship to the rigging: yet here there can be no doubt of its being distinctly heard at sea as the “roaring and screaming” of the wind in a typhoon or hurricane certainly is. My *present* theory to account for it is this. I suppose the storm to be really formed and to be “roaring and screaming” at say 200 miles’ distance, and that the noise, if not conveyed directly by the wind, may be so reflectively from the clouds, as in the case of thunder claps. A noise is known on some parts of the coast of England by the name of “the calling of the sea” as occurring in fine weather and announcing a storm, and also in mountainous countries. All these may be connected, and seamen may render great service to science and to themselves by noting these curious phenomena.

The sickly and dancing appearances of the stars, as noticed by Captain Rundle is also remarkable but more easily explained, as we may suppose the sickly (hazy) appearance to have arisen from the atmosphere being loaded with vapour half condensed, and the “dancing” to be occasioned by their appearing at times through spaces and intervals somewhat less loaded with vapour wreaths. If I am not mistaken the fixed light of a Light House has sometimes this dancing motion, by the effect of small wreaths of vapour passing before it, as at the breaking up of a fog? The vibrating appearance of distant objects seen through a telescope in the morning in tropical climates and owing to the different rarefactions of strata of air is familiar to us all.

Phosphoric flashes in the water, are common enough in fine weather, but are nevertheless well worth noting; we do not yet know

if more common in particular parts of the ocean, or at particular seasons, or in particular weather than at others.

The appearances of the clouds are of special interest, for there can be no doubt that many indications can be drawn from them of great value, both to the careful mariner and to the man of science. The remark of Captain Handley p. 14, shows the storm was forming to the eastward of him, and those of Captain Rundle, both as to appearance and motions are exceedingly interesting, as showing that there were different currents prevailing above, probably from one part of the storm or vortex over-reaching another.

The kind of lightning described by Captain Rundle, is also worthy of great attention: should this be found always to precede these storms in particular latitudes it would be, in addition to other signs, of great utility.*

The states of the Barometers and Sympiesometers of the various ships both as relates to the approach of the storm, and to the manner in which the instruments were affected every time the ships bore up, and, tempted no doubt by the fair winds, ran down to the S. Westward and thus neared the centre, is of peculiar interest; and it is highly worthy of remark that not one of them thought of *running to the E. N. E. or even N. E.* while the wind and sea admitted of it, which was the true course to steer, as may be seen by the chart and storm card. They would thus have raised their Barometers and should have then hauled gradually to the Southward, and South-westward, and so have *sailed round*, and eventually out of it. In this point of view the logs of the Fleming, Ainslie, Futtle Rozack, and Flowers of Ugie are remarkable, and most instructive lessons for us. These ships will almost indeed, to the eye of the studious seaman, appear to be manœuvring for the purpose of proving the value, the truth,—and I will add the beauty,—of the Law of Storms.

* I have found, while correcting this page, in the press a single instance in which this remarkable kind of lightning is described. It occurs in one of the replies to a circular addressed at my suggestion by the Hon'ble the Court of Directors E. I. C. to their retired Officers, requesting information on storms in the Indian Ocean and China seas, by Captain Jenkins, then commanding the H. C. Ship City of London: who says, speaking of an approaching hurricane in March 1816, in Lat. 12° to 18° South Long. 78° to 76° East, for which, warned by his Bar., he was preparing. "At 7, the appearance of the atmosphere altered, constant vivid lightning, *resembling in the distance the Northern lights* with frequent hard gusts of wind," &c. We are not to suppose from its being so unfrequently noticed that it is therefore of unusual occurrence; seamen are so accustomed to lightning that they rarely take the trouble to describe it.

In the Northern Hemisphere.

We have principally to remark here on what we may call the "generation of separate storms" at short distances from each other so analogous to what certainly occurred in the Calcutta storm of June 1842, though we might there suppose it to have been occasioned by the influences of the land, as hills, valleys, &c., but it would now appear that the state of the atmosphere which induces one rotatory storm often disposes, or gives rise to, others, just as after certain states of summer weather in Europe, we hear of a succession of thunder storms all over a large tract of country.

Thus we find that when the Fyzulbarry's storm (a true rotatory one) had travelled up from the S. Eastward two or three days, 27th or 28th to the 30th, another storm appears to have commenced at four degrees' distance with the Candahar, which we trace accurately enough through two days as travelling to the W. S. W. and if our conclusions be correct as to the Niagara and Mary Imrie, that the Fyzulbarry's storm when approaching this of the Candahar's, curved away to the W. b. S. This *looks* strange enough, but whatever are the causes of them, the *dust whirlwinds* on the plains of India, of which I have seen as many as four or five at a time, certainly *do* influence (repel) and alter each others tracks. We do not know if these arise from the same cause, but it is the only analogous fact that I am acquainted with,* and the scientific reader will judge from the data set down whether he thinks they are sufficient to entitle us to lay down the tracks which I have here given. There is I think no doubt of the storms being altogether separate ones.

It is remarkable that all these forces and storms seem to have been blended so as to produce one about Palks' Passage, evidently travelling to the Westward also, or rather generated like the other in advance of those raging in the bay, for we find that the Ceylon storms all began on the 1st, when the nearest centre, that of the Candahar's storm was at least at three degrees of distance; and it could not be part of this, for the Vernon's position limits it to the N. W. within a much more circumscribed circle, and I am therefore inclined to believe that at sea as on shore, independent vortexes arise like independent thunder storms.

Postscript.

In the preliminary notice to this Memoir, I announced that I had obtained from the Mauritius the detail of what I may call a beautiful expe-

* "It is possible that one storm may *deflect* another says Col. Reid," p. 433, 2nd Edition of his work.

riment, in which a vessel called the *Charles Heddle* was fully proving for us there, the truth of the researches we were making here. The following is the newspaper notice of it, written by myself, which will fully explain enough of this remarkable, or rather wonderful, fact and coincidence of actual experiments with theory and with resurches going on at thousands of miles distant.

"I have just received from Capt. Royer, the Master Attendant at Mauritius, who, like every one else, was much staggered by the report of the *Charles Heddle's* circular sailings for so many days in a hurricane, a number of logs, and with them her's, which he has taken the trouble to copy himself that there might be no mistake about it, and you will learn with pleasure that I have fortunately just completed a Memoir now printing, of which the evidence leaves no manner of doubt as to the possibility of a fast sailing ship, that could scud well, having really done what the *Charles Heddle* has; and it teaches us moreover, by two perfectly independent storms, at more than a year's distance of time, and in quite different parts of the Southern Indian Ocean, that there are storms of great intensity, lasting for long periods (in both cases five whole days) and which have yet so slow a progressive motion that one might, comparatively speaking, almost term them *stationary* storms. If you like to print this, for it is advantageous now and then to draw attention to the subject, and to show how much yet remains to be learnt, particularly with respect to the storms of the Southern Hemisphere, here are some of the data as briefly as I can give them.

First, from the accompanying chart (of this Memoir) you will see that between the 26th of Nov. and 1st Dec. 1843, and between latitudes $5^{\circ} 30'$ and 11° South and longitudes $83.$ to 89° East, there was a hurricane raging for the whole five days, which, traced by the logs of many ships, appears only to have travelled in that time, from point to point of its centre, about 255 miles, or allowing for the curves about a degree a day only.

The *Charles Heddle*, by her log now before me, appears to have scudded from the 25th to the 28th February, 1845, for five whole days round and round in a Hurricane circle! during which time she ran upwards of thirteen hundred miles; the wind made with her five complete revolutions, and from calculations derived from the distances and shifts of wind and the positions of the vessel, to have been on an average about 50 miles from its centre; which was slowly moving on, like the one of which I send you the chart, to the south-westward, at not more than three miles an hour; and the direct distance

made by her, from point to point, was but 354 miles. Now, if like the *Charles Heddle*, any of our ships in this November storm had scudded the whole time, they might undoubtedly have made much such a set of circles as you see on my chart, and yet have made but a trifle of direct distance in the whole five days; and in a word we can, so to say, *prove* by this Memoir that there is nothing at all of romance in her account, and that she has been performing for us a very curious and beautiful experiment; as cleverly as if she had been sent out to do it! The investigation of this and the other Mauritius storms for which I have data, will, I doubt not, lead to other equally important and curious facts in that dangerous quarter of which seamen as yet know so little, but the difficulties and trouble of obtaining log books are positively incredible."

The value of this experiment as a proof of the circular theory generally, if it requires any now, and of the truth of our researches I need not dilate upon. In a future Memoir I trust to be able to bring forward a great deal more in relation to the tracks and other peculiarities of the storms of the Southern Hemisphere.

NOTE.—While the last sheets of this Memoir were passing through the press, I obtained by the kindness of Capt. J. Viall, the log of the ship *John Brightman*, just arrived from the Mauritius, and which ship it will be recollected was seen by the *Fyzulbarry* on the 28th November, (page 14,) being bound to the Southward. This log, while it corroborates exactly the general direction of the track of the *Fyzulbarry's* storm, enables us to correct the place of the centre for the 29th, which being laid down from the log of a single ship, without observation, is necessarily subject to error, though here as so frequently before, the error does not amount to much, and all the *relative* data for practical purposes on board either of the ships in the storm, would have been the same: as for the management of a ship, what is required to be known, is the bearing of the centre of the hurricane, and the track of the storm, provided there be ample sea room.

From midnight 27th November.—The *John Brightman* had heavy squally weather and winds from East to E. S. E., and N. N. E. She was at noon in Lat. $9^{\circ} 48' N.$, Long. $87^{\circ} 44' E.$, Bar. at 29.63. (having been at 29.71. at noon 26th, since which time she had run down South, and S. b. W., 138 miles.) P. M. wind E. b. S., and E. S. E. to midnight, when it was a strong gale with a tremendous cross sea, the vessel having always run to the South and S. b. E. to midnight 56 miles. Bar. 29.58.

28th Nov.—Wind and weather the same, 7 A. M. wind E. N. E., Noon strong gale and high sea, Lat. indifferent Obs. $7.48 N.$, Long. $87^{\circ} 48' E.$, P. M. wind E. N. E., East, and E. S. E. to midnight when Bar. 29.41. Ship's run from noon between S. S. E. and South $53\frac{1}{2}$ miles.

29th Nov.—Hard gales, squalls, and sea continuing as before from East, E. S. E., and E. b. N., Noon more moderate, but weather looking very suspicious, Lat. Acct. $6^{\circ} 03' N.$, Long. $87^{\circ} 58' E.$ Bar. 29.30. Ther. 83° . Ship's course from midnight to noon South to S. S. E., $51\frac{1}{2}$ miles, P. M. wind veering from E. b. N. at noon, to N. E. b. N., and N. W. to West, and by 4 P. M. to W. b. S., light variable winds and thick weather. At 2 P. M. breeze increasing, thick unsettled weather, Bar. 29.24. At 4 P. M. fresh gales W. b. S. hove to. At 8 heavy gales and vivid lightning with rain and squalls, Bar. 29.28. Midnight Bar. 29.20.

30th Nov.—A. M. to noon hove to. Bar. rising to 29.36; at noon Ther. 83° , wind W. S. W. Lat. by indiff. Obs. and Acct. $5^{\circ} 46' N.$, Long. Acct. $88^{\circ} 31' E.$, P. M. Wind S. W. and at 5 P. M. S. S. W., weather moderating. Midnight Bar. 29.49. Wind South at 5 P. M., and S. S. E. by noon 1st December when Lat. $5^{\circ} 19' N.$, Long. Chr. $90^{\circ} 16' E.$ Ther. 84° , Bar. 29.59.

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Translation of the Toofut ul Kiram, a History of Sindh. By
Lieut. POSTANS.

Introduction.

The following translation of the most succinct, consistent, and continued history of Sindh, which I have yet met with, has been made under the idea that, intimately connected as we have become with that country, its history cannot be otherwise than highly interesting, and that there are many who may desire information on the subject. The author of the "Toofut ul Kiram," has in his 3rd vol. collected materials from the best authorities; I have only omitted legends and stories, which have been given elsewhere, (Bengal Asiatic Society's Journal,) as also the histories of holy Seers, Sheikhs, and Seyuds, they being alone interesting to the followers of the prophet; for the rest I believe it to be nearly a literal rendering of the text into English, with a few explanatory notes. I regret, that want of time, and emergent public duty, will not allow me to do more at present.

It will be seen that, with the exception of a very short period prior to the Mahomedan conquest by Bin Cassim, in the first century of the Hejira, we have no account of the country under its Hindoo rulers; and I regret to say, that all efforts to procure any information on the subject have hitherto proved unavailing. Had the Mahomedan historians sought for materials, they might doubtless have been found, and thus the hiatus between the expedition of Alexander, and that of the Khalif Walid, might have been filled up, so as to throw some light upon a portion of the coun-

try, rendered memorable by the great conqueror's passage down the Indus. As it is, we have a blank of nearly eleven centuries; and we only know, from the description herewith given of the extent of country tributary to the Sindh Rajahs or *Rahis*, that they were powerful princes, and that the kingdom of Sindh possessed in their time a degree of importance which declined after its subjugation by the Moslems, when it became dismembered, and fell a constant prey to succeeding conquerors.

From the period of the Mahomedans entering Sindh to the accession of the present family of *Talpúr* chiefs, the chronological order of its various rulers may be thus briefly given, and the number of dynasties during a period of about 1200 years, affords a curious instance of eastern revolutions. From Bin Cassim downwards, Sindh has fallen to the arms of the greatest conquerors of the East.

Taken by the Khalif Walid.

Beni Oomhae,...	...	...	...	H.	93
Falls to the Abbasides,	...	...	...	,,	133
Subdued by Mahomed of Ghuzni,...	...	...	...	,,	416
Tribe of Sumrahs usurped the authority,	...	...	...	,,	446
Invaded by Jengiz Khan,	...	...	...	,,	610
Tributary to Delhi,	...	...	...	,,	694
18 Jams of the tribe of Súmah,	...	...	...	,,	752
Conquered by Shah Beg Arghún,	...	...	...	,,	927
Divided between the Arghúns and Tirkhans,	...	...	...	,,	950
Conquered by Akhbar under the Khan Khanam, and ceases to be independent,	...	...	...	,,	999
Invasion of Nadir Shah, and annexation to Persia,	...	...	...	,,	1149
Kalora Chiefs rule in Sindh, tributary to Cabul,	...	...	...	,,	1166
Kaloras overthrown by the Talpúrs,	...	...	...	A. D.	1779
Talpúrs cease to be tributary to Cabul,	...	...	...	,,	1839*

The downfall of the Kaloras during the time of Sir Afraz Khan (where the manuscript ends,) and the rise of the present Talpúr family, have been so fully given elsewhere, that I do not annex the account to this transla-

* To this list we may now add, "Conquered by Sir C. Napier, and annexed to British India, by Lord Ellenborough,—A. D. 1843."—Eps.

tion*. Of the languages of the country the *Simdee* has been described by Mr. Wathen, and an excellent grammar, written by that gentleman, published by Government†. The Persian language is used by the higher classes, and is that in which all the State correspondence and revenue accounts are kept; most of the Hindoos of Upper Sindh speak it fluently, the result of their intercourse with the natives of Affghanistan. A slight knowledge of it will be found of very considerable service to individuals stationed in the country.

As connected with this translation, I would beg to refer all those desirous of obtaining information on the inhabitants, cities (ancient and modern), and divisions of the country of Sindh, to the admirable papers published in the Transactions of the Royal Geographical Society, and written by the late Capt. Jas. McMurdo, "An account of the country of Sindh, with remarks on the state of society, manners, and customs of the people, &c."

J. POSTANS,

Shikarpore, 5th July, 1841.

Assistant Political Agent.

Sindh is one of the sixty-one divisions of the world, situated in the four first climates, belonging chiefly to the second, and is in the same region as the holy cities of Mecca and Medina; the river of Sindh rises in the mountains of Cashmere, another joins it from the mountains of Cabul, in Multan it is met by the river *Sibine*, and there proceeds to the sea. Its water is very clear and cool: in the language of the country it is called *Hickrand*; all the rivers of Sindh flow towards the south, where they empty themselves into the sea, such as the waters of *Pitab*, *Chinab*, *Sehae*, *Suttanpur* and *Bajawareah*. The climate of Sindh is delightful, its morning and evening cool: the country to the north, hotter than that to the south; its inhabitants intelligent, and of large stature.

Let it not be concealed, that whilst the people of Sindh were formerly ignorant of the Persian and Arabic languages, no account as a compilation existed of those countries; but in the year 613 H., *Alli Bin Ahmid*, *Bin Alli Bukur Kufi*, an inhabitant of Ooch, wandered to this valley, and arrived at the cities of Bukur and Alor, where he saw the families of the great men and descen-

* See Dr. and Sir A. Burnes, and Sir H. Pottinger.

† A vocabulary by Capt. Eastwick, and a grammar and vocabulary of the Brahoos and Beloochi languages, by Major Leech, have also been published in our Journal.—
EDS.

dants of the Arabs, and searched for accounts of the conquest of the Moslems in all its particulars; he also became acquainted with *Cazi Ismail*, *Bin Alli*, *Bin Mamomed*, *Bin Moussa*, *Bin Jahir*, and saw in the possession of that great man a description in Arabic, written by his ancestors, of the conquest of Sindh: this he translated into Persian. After him, *Meer Masoom Bukeri*, and after him *Meer Mahomed Jahir Massiani*, in the times of Akbar and Jihangir,

The work known as the *Chach Nameh*, which brings the history of Sindh down to about 16 A.D., was written by *Meer Migawar*.

composed works, and also the "*Urghim Nameh*," "*Jukhar Nameh*," and "*Byler Nameh*" were compiled. Subsequent to these no clear account existed (or no one was acquainted with affairs) up to my own time; by abbreviating and selecting

from various books, and by recording some new events, I trust it will be found acceptable to all men.

Let it be understood, that according to what has been previously mentioned, the province of Sindh was so called from "*Sindh*" (the brother of *Hindh*, the son of *Hoh*) whose descendants from generation to generation governed in that country, and tribes without number came forth and ruled, whose accounts are not recorded. From amongst these the tribe of *Nubuja*, the men of *Jak*, and the tribe of *Momid* ruled in their turn: of these there are no detailed accounts, so that they pass on to the last of the *Rahis*; and after that they relate the histories of other classes.

The dynasty of the *Rahis* had their capital at *Alor**, and the boundaries of their dominions and possessions were to the eastward as far as *Cashmir* and *Kimuj*, westward to *Mikran* and the shore of the sea of *Oman*, i. e. at the port of *Derjul*, to the south to the confines of the port of *Surat*, and to the north to *Candahar*, and *Seistan*, with the hills of *Sulliman*, *Kirwan* and *Kaijkanan*.

1. *Rahi Diwahij*, a distinguished prince; his sway extended over the boundaries described, and was absolute. The princes of *Hind* were in treaties of friendship with him, and in all his territories the merchant (*Caravans*) travelled in safety.

* The ruins of *Alor* are still to be seen about four miles from *Roree*; opinions differ as to the river having at any period flowed in that direction, as stated in the "*Tooputal Kisum*." I cannot learn that there are any traces of *Hindoo* architecture to be found at *Alor*.

2. When he died, his son *Sahiras* was exalted to the crown, and in the steps of his father he for a long period enjoyed ease and prosperity : after his death, his son,

3. Rahi *Sahasi*, succeeded happily to the high seat of empire and the throne of Dominion ; he conducted his affairs prosperously, and successfully followed out the institutions of his predecessors : after him, his son,

4. Rahi *Sahiras* the 2nd, took his place. The king (of) *Nimraz* brought a force against him ; on learning this intelligence, he met him in the country of *Kich* and prepared for battle ; from morning until noon they were occupied in conflict, but by chance *Sahiras* was wounded by an arrow in the neck and died. The king *Nimraz* despoiled his camp and returned. The army of *Sahiraz* agreed together, and placed his son *Sahasi* upon the throne.

5. Rahi *Sahasi* the 2nd, excelled his ancestors in endowments and good qualities ; in a short period he consolidated and settled his dominions as far as their boundaries extended, and remained at his ease in his capital. He ordained for his subjects in lieu of tax, that they should fill up with earth (repair) six forts, viz. *Ooch*, *Matilah*, *Siwari*, *Mud*, *Alor*, and *Seewistan*.

They say he had a porter named *Ram*, and a minister named *Boid-*
 Introduction of the Brah- himan : one day a brahmin named *Chach*, son
 min *Chach* to the Rahi. of *Silabig*, distinguished amongst his class,
 came to *Ram*, and they became acquainted ; the porter was well pleased with him, and took him to the minister, after some time, and when *Chach* was intimate with the minister, it so happened, that the latter became sick, and the Rahi's order arrived, to call the agents of the provinces together ; now since he (the minister) saw that *Chach* was acute and intelligent, he sent him from himself to the Rahi, who was in the inner apartment of the palace. His wife *Rani Sohindi* wished to draw the veil, but the Rahi said what necessity can there be for a veil before brahmins ; and when the brahmin *Chach* entered, *Sahasi* became delighted with his eloquence, and dictated his replies to him ; so in time, when the ability of the brahmin became apparent to the Rahi, he directed that in future the curtain should be dispensed with in his favor, and that the necessary affairs of State should be transacted in the inner department of the palace ; at this juncture the

Rani became enamoured of *Chach* to distraction ; but notwithstanding she sent messages, *Chach* would not consent to her views, until his affairs prospered, and he had laid all classes under obligations for his favours and wisdom. By the chance of fortune's favours the *Rahi Sahasi* was attacked with a mortal illness. The *Rani* called *Chach*, and said, "The *Rahi* has no children or descendants, certainly his relations will become heirs to the country, and it will not remain with you and me; I will therefore devise some scheme, in order that the throne may be secured to you:" to this he agreed. The *Rani*

Succession secured to sent messages in various directions to the intent, that the *Rahi Sahasi* had become convalescent, but had not strength to conduct his own affairs, (to rise up); "some time has elapsed, and the affairs of the country were in confusion, now he has directed and given his signet to *Chach*, who is to sit in his place on the throne, and who will demand from you the particulars and accounts of the important business of the State, wherefore by all means let all of you be present:" all the rulers and great men, in obedience to the summons, presented themselves, and made their obeisance and bowed the knee to *Chach*. A short time after the *Rahi* died; the *Rani*'s first care was to conceal his death, and having separately called those of the relations of *Sahasi* to the palace, who had claims (on the succession,) under the pretence of explaining the late *Rahi*'s will, she imprisoned (chained) them; then calling their poorer connections, she said—"I have arrested these claimants to the throne on your account, each of you having his enemy here should precede the assembly and kill him, and having taken possession of his property and riches, let him become obedient to *Chach*; thus will he attain all his wishes." Thinking this the height of good fortune, these people did as they were directed: the period occupied by the rule of the five preceding *Rajahs* is 137 years, and then it descended to the *Brahmins*.

1st.—*Brahmin Chach Bin Silabij*. When *Chach* after the manner described became sole heir to the throne, as advised by the *Rani*, he opened the doors of his treasury and bestowed largely upon high and low; at length the *Rani* having accomplished her ends, called together the nobles, head *brahmins* and great men, &c.

directed them to make her lawful (as a wife) with Chagh, and they were married, (connected in that knot) accordingly.

The Rana *Mihrut Chitoori*, who was a relation of *Sahasi*, having heard this, collected and brought a countless army by stratagem, and wrote to Chach saying, "What have brahmins to do with rule or government; give me the authority, and you shall be reinstated in your former appointment."

Chach went himself to the Rani and said, "A powerful enemy has come forth—what do you advise?" the Rani said, "War is understood by men, (but) if you will change places and apparel with me, I will go forth and do battle with the enemy;" *Chach* was afflicted and distressed. The Rani, encouraging him, said, "You have treasure, quickly propitiate the soldiers, so that you be victorious." *Chach* immediately acted on this advice, and bestowed much wealth (on his army)—he thus was prepared. *Rana Mihrut* arrived in the neighbour-

Rana of Chittore's hood of *Alor*; when the two armies met, *Rana Mihrut* came forward, and said to *Chach*, "We are alone concerned in this quarrel, why should a multitude be needlessly destroyed; advance and let us make trial of our strength:" to this *Chach* replied, "I am a Brahmin, and cannot fight on horseback; descend, and I will combat with you." *Rana Mihrut* alighted from his horse, and *Chach* directed his groom to bring his horse slowly after him. *Rana Mihrut* being off his guard from this excuse of *Chach*, left his horse behind: they met—*Chach*

sprang swiftly on his horse, and with one blow killed *Chach* kills the Rana and returns his adversary. The Rana's forces returned dispirited and discomfited, whilst the victorious *Chach* returned to *Alor*. These affairs occurred about the first year of the Hijera. In short, after the victory over *Rana Mihrut*, *Chach* took

counsel with the minister *Budhiman*, and appointed his own brother *Naib of Alor* for the settlement of the dependencies thereof. One

named *Muttah* was sent to govern *Sewistan*, and *Governors to coun-* tries appointed by *Akham* *Lohana*, governor of *Brahmanabad*, and *Chach*. *Basar Bin Kakah* having subdued some of the holders

of the forts in *Sewistan* (or *Sibi*), as also some tribes of *Sewis* (the capital of their country being *Kaka Raj*), and *Chach* after having passed 40 years prosperously died, his

Death of *Chach*,
after reigning 40
years.

brother *Chundur Bin Silabij* was vice-regent of the empire. *Muttah*,

Chundur Bin Silabij. the governor of Sewistan, went to the Rahi of Kunnuj, reporting Chach's death, and saying, "His brother is

now lieutenant of the empire, if you attempt it the possession of the country will be an easy affair." The Rahi sent his brother named *Basahis* to Muttah; and Chundur immediately on hearing this prepared to oppose his enemy, and pursued Muttah and Basahis through various portions of his dominions up to the vicinity of Alor; they tried various schemes, but at last failed. In short, he (*Chundur*) ruled prosperously, until the 8th year, when he died. After him, his nephew,

2nd.—*Dahir Bin Chach*, adorned the throne; his brother *Dihir Sin*

Dahir, son of Chach, he sent to Brahminabad as governor. One day he 2nd Brahmin.

inquired of the astrologers as to his fate; they told him there was no bad omen in it, "but with whomsoever your sister marries he will succeed to Alor, and rule the country." Through fear of losing the country, Dahir contrived and married his own sister. His brother *Dihir Sin* was vexed at this intelligence, and prepared a force,

Dihir Sin, his brother, rebels against him: his death. and in time arrived at Alor, but died from small-pox;

Dahir caused him to be burnt, and proceeded to Brahmanabad, where he married his wife (brother's) the daughter of Akham Lohana, and remained there one year; and having appointed the son of Dihir Sin, named Chach governor of Brahmanabad: he returned to Alor, where he repaired the fort, which had only been half completed by his father, and arranged that four months of the cold weather should be passed in Brahmanabad, and four months of spring at Alor. In this way he occupied himself for eight years, and by degrees the affairs of the State were settled satisfactorily.

In short, having fixed the boundaries of his dominions to the east, he planted two cypress trees as a mark on the confines of Cashmere, and returned.

Accounts of the joining (assembling) of the Allafi Arabs.

The learned in such matters relate, that during the time of the Khalifat of *Abodal Malk Bin Mirwa*, when *Hijaj* was governor of the Iraks, and his designs were directed towards Sindh and Hind, he sent a Seyud to Mikran, who killed *Siffooi Bin Lam Himami*; *Abdulah Bin Abdul Rihem*, and *Mah Bin Mokawyah* called together the

Arabs of Beni Asamah, and represented, that "the Siffooi, who was one of our tribe and people, has been killed unjustly; we must assemble and revenge him."

In short, they acted on this suggestion, and killed the Seyud and took possession of *Mikram*; after some time they fled through fear to *Kharassan*: *Mujahameh Bin Seyud* came to *Kirman* to conquer *Kharassan*, and sent forward *Abdyl Rukman, Bin Ashahas*. The *Allafis* laid wait for him, and killed him; they fled to Sindh and came to *Dahir* who, thinking them well adapted for the

The Allafi tribe of Arabs are taken into the service of Dahir.

police and protection of his country, took them into his own service. The above mentioned *Allafis*

were in Sindh until the coming of Bin Cassim, and the conquest of that country, when having procured a promise of pardon, they joined Bin Cassim. At length the princes of Hind having learnt the absolute dominion of Dahir, agreed together that previous to his attempting

The princes of Hind jealous of Dahir's power.

their conquest, they should take an army and conquer his country, and according to the agreement of the *Rahis, Rahi Ra Mal*, governor of

Kunnuj collected a large force, and advanced upon Dahir and surrounded Alor; Dahir was afflicted by his enemy, and asked advice of the minister *Budhiman*, who said, "The Arabs are expert in battle, entrust the affair to them." Dahir came to Mahamed Allafi, and sought

his friendship (assistance); the latter said, "Be satisfied, bring not your forces, and direct that a deep ditch be dug to the length of a fursakh; cover it over with grass, and leave it; after that, do as I direct."

The Allafi chief defeats the governor of Kunnuj by a stratagem.

When Dahir had thus done, *Mahamed Allafi*, with 500 Arabs and Sindees, picked men, made a night attack on the troops of *Ran Mal*: these being taken by surprise and awaking confused, fell on each other and destroyed themselves, and the illustrious Mahamed Allafi gave the signal for flight; the enemy, when they learnt that so small a force had attacked them, pursued and fell into the ditch; now Dahir himself with his force came out and took 80,000 men prisoners, and 50 war elephants: according to the directions of *Budhiman* the minister, he set them all free. *Budhiman's* wisdom was proved, and Dahir lavished his favors on him, and according to his entreaty, directed his name to be struck on one side of the copper coins.

From this victory Dahir's position became strengthened, but the surrounding provinces and states were dissatisfied, and nourished more rebellion and sedition. He conducted the affairs of his country prosperously for 25 years, when his punishment was the loss of his kingdom, as will be related with other circumstances.

Account of the capture of the Slave Girls of Sirundip.

They relate, that the country of Sirundip* is of the ruby islands; from this had been sent some Abyssinian slaves with many valuable jewels and curiosities for the Khalif and Hijjaj, in the care of confidential servants in eight boats; by chance these were driven by a storm to the port of *Diwāl*, in the sea of *Oman*; robbers belonging to that place, of the tribe of *Nikamrah*, seized these people, and the representations of the agents of the king of Sirundip, that they were presents to the

Reason of the first invasion of Sindh. Mohamedan Khalif, had no effect. They said, "If your story is true, pay a ransom and procure re-

lease." In that assemblage were certain women in the purity of Islamism, who had intended making the Haj, and seeing the capital of the Kalifs; and Hijjaj, one of these, cried out thrice, "Oh Hijjaj! hear our complaints."

This intelligence was conveyed to Hijjaj; when he heard that the women had complained thrice in his name, he replied, three times, "I attend," and prepared to remedy the affair.

Account of the death of Bazil.

When Hijjaj Bin Yusaf prepared to release the Moslem captives, he represented to the Khalif, and sent a messenger with threats to Dahir; the Khalif was unconcerned in the matter, and Dahir said, "I am ignorant of the affair, these robbers do not acknowledge my authority, they may have done so or not; but you must judge." On the receipt of this answer, *Hijjaj* again represented to the Khalif, and obtained the required permission.

* Ceylon, thus proving a traffic between that place and Damascus.

† Is called from the *Diwala*, a temple for which it was famed. See Capt. McMurdo, Transactions of Rl. Geog. Society.

He appointed Abdul Allah Sullimah to Mikran, and ordered Bazil that when he arrived at Mikran, he should collect 3,000 men and advance on Sindh. Bazil arrived at the Fort of *Neirun*, and threatened *Diwal*; Dahir having learnt this, sent his son Jaisisih with a large force to Diwal; from noon to night they contended. Bazil, after the utmost resistance, was killed, and many Moslems were captured. They say

Battle at Diwal, and death of Bazil. the governor of the Fort of *Neirun**, who was named *Samani*, became terrified, and said to himself, "I guard the pass of the Arab forces into this country, they (the Sindees) have thus opened the road of revenge to the Arabs, it may not be that I should be crushed between the parties (hereafter):" accordingly he sent a confidential agent to Hijjaj and proffered his obedience, and obtained pardon. *Amur Bin Abdullah* said to *Hijjaj*, "Commit this momentous business to me, and I will proceed to Sindh and Hind;" but he was refused. Hijjaj said, "I have consulted the astrologers, and they report that Sindh and Hind will fall to the hand of *Mahomed Bin Cassim*. In

Bin Cassim pre-ferred to the command of the Sindh Army. short, the period has now arrived for the setting of the star of the unbelievers, and the ascendancy of the religion of the prophet in those countries; this affair is more important than former undertakings, and must be intrusted to Bin Cassim." It shall soon be related from first to last.

Here I proceed to relate the extraordinary birth connected with the name of *Jaisisih*. They say the Rahi Dahir was son of Dahir. one day hunting, suddenly a tiger sprung from the jungle, Dahir stopped those who were running away, and himself prepared to attack the beast. His wife at this time had been pregnant ten months with Jaisisih, and being very fond of Dahir, and learning this she cried out and swooned; at length Dahir killed the tiger and returned unhurt, but he found his wife dead: seeing the child moving in her womb, he ordered her to be opened, and they brought out the child; and this name, which signifies "the hunter of tigers," was given to him, and indeed when he became of years he was renowned for his courage and intrepidity.

* *Neiremkote*, site of the present capital Hyderabad; this latter was founded by Gholam Shah Kallinah.

Accounts of the arrangement and arrival of the Moslem army for the conquest of Sindh.

In true histories it is related, that during the *Khalifat* of the chief of the Arrangement and true believers, *Umur Bin Khotah*, (God's approval arrival of the Mahomedan army for the conquest of Sindh. be on him,) when *O'sman Bin Hás* was appointed governor of *Barin*, who having arrived at Oman, sent some vessels properly equipped under *Mughirah Bin Abul Has* to Diwal ; at that time the brother of Chach, named *Samami Bin Salabij*, was governor of the place ; he opposed the Mahomedans, and after a great deal of slaughter *Mughirah Bin Abul Has* was killed, with many others, also many prisoners were taken. *Abu Mussa Ashghuri*, who ruled in

Various governors of Mikran attempt to subdue Sindh and fail.

Mikran, reported this circumstance to the Khalif, and wished to apply some remedy, but was prohibited from collecting troops ; again at the time of the *Khalifat* of the chief of the believers, *Ashman Bin Hassan* (may God's approval be towards him) *Abdullah Bin Amir, Bin Rubiah* became governor of Mikran, it was ordered that a confidential agent should be sent to Sindh, to spy into and discover the state of affairs. He sent *Hakim Bin Hulliyah* with directions to make himself well informed of every thing and report thereon ; the *Hakim* said, that the water was black, the fruits were sour and poisonous, the ground stony, and the earth saline. The *Khalif* asked, what he thought of the inhabitants ; he replied, "They were faithless." Thus the preparation of a force from that quarter (Mikram) was abandoned. Then in the *Khalifat* of the chief of the true believers, *Alli*, a force passed from Mikram, and victorious and successful arrived at the hill of *Kag-Kaman*, which is one of the boundaries of Sindh, 20,000 hill men opposed theirs ; the Moslem army calling on the Most High, began the attack, the noise of the shouts terrified the enemy, who cried for quarter, whilst others fled. From that time on occasions of conflict, the Moslem noise of calling on the Most High is heard in those hills. The news of the death of the *Khalif* arrived, and any further advance was stopped. The force above mentioned returned to Mikram. When *Mohawiyah* obtained sovereignty, he appointed *Abdullah Bin Sawad* with 4,000 men for Sindh ; by chance they arrived at the hill of *Kag-Kaman*, and were defeated by a large force of the unbelievers,

Mohawiyah prepares a force for Sindh.

and at length returned and arrived at *Mikram* ; at that juncture, *Zyad* was governor of the *Iraks* on the part of *Mohawiyah*, who wrote to him to send *Rashid Bin Oomur* to Sindh, and he took possession of the hill of *Pageh*, taking also the whole of the property found there.

Thus he also possessed himself of *Kag-Kaman* : he arrived at the hills of *Mamzur* and *Bihung* ; the hill men, to the number of 50,000, assembled, and took possession of the passes ; from morning to evening they fought desperately, *Rashid* was killed, and the Moslems defeated. The repairing of this affair was deputed to *Rashid Bin Salim*, he defeated the men of *Kag-Kaman*, and arrived in the territories of *Budyha*, where he was killed. Then *Munzir Bin Harut*, *Bin Bashar*, became governor of these provinces. He fell sick at *Purabi*, and died : at this time also *Mohawiyah* died, and *Mirwan* succeeded him ; in his time no one was deputed to his enterprise until the time of *Abdul Malk* ; he gave the governorship of the *Iraks* to *Hijaj*, who sent the *Seyud* to *Mikram* ; he, it so happened, was killed by the *Alleifs* as has been before related, whereupon *Hijaj* sent *Mujjah* to *Kirman*, to take revenge upon the *Allafis* of Sindh ; he died there in the distractions of these times. *Abdul Malk* the *Khalif* died, and *Walid* succeeded him, sending *Mahomed Bin Haris* to *Mikram* to settle the affairs of *Hind* and the *Allafis* ; he killed one of the *Allafis*, and in the space of five months settled the country of *Mikram* satisfactorily, and took possession of various districts. After that the circumstances of the death of *Bazil* occurred as related, which increased the desire of revenge in *Hijaj*, and it was settled to send *Bin Cassim Sukifi*, as will be related.

Relation of the arrival of Bin Cassim in Sindh, and account of the victories which he there achieved.

After the circumstance of the death of *Bazil Hijaj Bin Yasaf*, it was represented to the *Khalif* that in Sindh insolence had obtained such ascendancy, and punishment was so loudly called for, that he must issue his order for remedying these things, as also for the release of the Moslem prisoners, and taking revenge for the rebellion of those unbelievers, so that the country might be conquered. The *Khalif* replied, "The country is distant and unproductive, the expence of collecting forces will be ruinous, and only accomplished by oppression ; it is better

to abandon the project, and pass it by." *Hijaj* continually represented, that by the permission of the Most High, and the protection of the religion of the prophet, the infidels would soon be subdued, and the prisoners of the faithful who, for so long a period had been confined there, would be released, whilst the outlay for collecting an army should be paid over and doubled by those who were its causes. The Khalif being without option issued the order, and in the 92nd year of the Hijera, *Mahamed Bin Cassim*, *Bin Akib Sukfi*,

The Khalif issues the order for the subjugation of Sindh in the 92nd year H.

cousin and son-in-law of *Hijaj Yasaf*, and 17 years old, made exertions, and they collected and sent with him 6,000 men from Sham and Irak.

They arrived at Shiraz, where they made the necessary preparations. *Hijaj* then sent five battering rams with the equipment for breaching forts, in boats, in the care of *Mugheriah* and *Khizam*, with a select party. Thus they arrived at the port of Diwal, where they afterwards joined him (*Bin Cassim*). In short, *Bin Cassim* with all his previous and present forces, mustered 6,000 horse and 6,000 camels (of the class known as "*Bukhti*") to carry his baggage, and set out for *Mikran*, and *Mahamed Harun*, notwithstanding the infirmity of his health, accompanied him; when they arrived at *Mapilah*, *Harun* by the decree of the Almighty died, and was buried there. They relate, that at that time *Jaisisik* the son of *Dahir*, was in the fort of *Neirun*, and wrote to his father the intelligence of the arrival of *Bin Cassim*: he consulted the *Allafis*; they said, "The cousin of *Hijaj* is coming with a large army, do not oppose him." *Bin Cassim* subdued *Arman Bilah*, and proceeded towards Diwal; in the mean time *Mugheriah* and *Khizan* with their party had arrived at Diwal, where they joined him. *Bin Cassim*

Bin Cassim invests Diwal.

threw a ditch round Diwal and encamped; he wrote intelligence of his arrival to *Hijaj*. They say, that the news reached *Hijaj* in seven days, for such was the swiftness of the messengers, that the intelligence of seven days' date, from and to, was daily received by each party. It is said, that in the fort of *Diwal* was a temple (place of idols) 40 guz in height, and in it a dome 40 guz high, and on the top of the dome a silken flag with four ends. The infidels in fear and dismay made no preparation to fight: after some days a brahmin came out from the fort and asked for safety; he presented

The temple at Diwal is considered as a talisman for the protection of the country.

himself to *Bin Cassim*, and said, "I learn from my books that this country will be conquered by the Moslems, and the time has arrived, and you are the man. I am come to shew you the way: those before our times have constructed this temple as a talisman; until it is broken your road will not be opened; order some stratagem, so that the banner on the dome may be thrown down." *Mahamed Bin Cassim* bethought him how he should accomplish this; the engineer with the Catapulta said, "If you give me 10,000 dirhems I will agree by some means or another to bring down the banner and dome in three blows, if not I will have my hand cut off." *Mahamed Bin Cassim* having obtained

Dome of the temple thrown down.

permission from *Hijaj*, ordered the Catapulta to be used, and by the help and power of the Almighty, in three blows the work was accomplished, when the army of Islam getting into ranks and order attacked the fort, and the infidels being confounded were powerless and begged for quarter. *Mahamed Cassim* directed, that none should be given, but to deliver up the place. The

Capture of Diwal and massacre of the infidels.

governor threw himself from the breastwork, and fled, and the people of the fort being helpless opened the gates: for three days there was a massacre; they then brought out the Moslem prisoners, and captured immense treasures and property; they destroyed the temple of idols, which was called Diwal after the place, and built a masjid. A man named *Kihilah*, one of the infidels, was the keeper of the Moslem prisoners; when these were brought out it was discovered that he had exerted himself greatly in their behalf, and was overjoyed at their release as well as the victory of the army of Islam: *Mahamed Cassim* called him and pressed him to embrace the true faith, and he became a Moslem. After many honours and favours, he shared with *Ahmed Bin Darah Nijdi* the governorship of that place. At length, having satisfactorily arranged the affairs of that quarter, and placed his battering rams in boats, he started them by the river Sakurah to Neirun, and he himself proceeded

Bin Cassim proceeds to Neirun.

by land in the same direction. They say that the son of *Dahir*, *Jaisisih*, was formerly at Neirun, but after hearing of the victory at Diwal, *Dahir* called him to *Brahamanabad*, and *Samani* the former governor of Neirun, who had procured a certificate of pardon from *Hijaj*, as before mentioned in the account of the death of *Bazil*, was with *Dahir*. Now when *Mahamed Cassim*

after seven days arrived in the vicinity of Neirun, the defenders of the fort fastened the gates. The army of the Moslems were much distressed in the neighbourhood of Neirun for water, by reason of there being no inundations; Mahamed Bin Cassim made applications to the Most High, and they were immediately succeeded by a supply of rain, and the springs and tanks of that part of the country overflowed like fountains; still there was a deficiency of forage: by good fortune, *Samani* arrived at Neirun, and sent his confidential agents with the certificate of pardon to Bin Cassim, and said, "I am

The governor yields up the fort of Neirun. the slave to be obedient, the reason of this omission is, that during my absence the people in the fort have closed the gates; I wish if you will pardon the fault and warrant my safety to come and kiss your feet." *Bin Cassim* having paid due attention to those who had been sent, ordered "That it was necessary to punish those who had guarded the gates, but since you have interceded, come have an interview, and open the gates." *Samani* having done so, took the keys with suitable presents, and made his obeisance; he was favored, and provided every thing that was required. At length the army of Islam entered the fort; they destroyed the temples, and built musjids and minarets in their stead,

Governor appointed. Mouzzins and Imams were appointed, and Shunheh was made governor of the place. Taking *Samani* with him, Bin Cassim advanced; when they had proceeded some distance from *Neirun* at the place called *Mauj*, *Samani* sent a letter to *Bicharah*, son of *Chundur*, governor of *Sewistan*, thus: "We are not the men to bear force; this Arab army is all powerful; there is no use in opposing them;

Governor of Sewistan refuses to submit. it is necessary to look after the interests of yourself and people, come and proffer your obedience, the word of *Bin Cassim* is powerful, undoubtedly this is the best policy." *Bicharah* refused to accede to submission, but prepared for battle. Thence the Moslem troops having advanced, reached the fort of *Sewistan*; one week was occupied in laying siege and attack; until at length *Bicharah* becoming dispirited, fled and went to *Budyah*; *Bin Kakah*, *Bin Kotah*, who was governor of the castle of *Sim* *Mahamed Cassim* entered the fort of *Sewistan**, and took posses-

* *Sewistan* always means the modern *Sehwan*.

sion ; he favoured such persons as were brought to him by *Samani*, and

Bin Cassim enters then started for *Sim*. The forces of *Budyah* and *Sewistan*.

Bicharah prepared for opposition. The infidels went to *Kakah*, *Budyah's* father, and requested permission to make a night attack. *Kakah* said, "I know from the astrologers that the army of Islam will conquer this country, and that the time has now arrived ; do not entertain such ideas." They would not be restrained, but prepared for a night attack ; it so happened that they lost the road and dispersed into four parties, and although they wandered all night, they found themselves in the morning near the gate of the fort of *Sim*. Being afflicted they became penitent, and went to *Kakah Chanah* and stated their case. He said, "Do not think me less valiant than yourselves, but I know for certain that there is no use in contending with these men." In short, *Kakah* went himself and proffered his obedience ; he was received with favour, and obtained safety for his followers. *Mahamed Bin Cassim* sent with him *Abad al Mulk Bin Kies Aldaki*, and ordered them to bring all who would be obedient (to his sway,) and to punish all who resisted. The Almighty gave them daily victories over

the infidels, and at last these being frustrated, fled Gain fresh victories, the infidels proffer to the forts of *Bultur Saluj* and *Kandail*, when obedience.

they solicited promises of safety and pardon, and, agreeing to pay tribute, departed to their own country : at this time an

Hijjaj sends order to *Bin Cassim* to sub- due *Dahir*. order arrived from *Hijjaj*, that *Mahamed Bin Cassim* should return to *Neirun* to prepare to cope with *Dahir*, and cross the river *Mihran*.

It is related that the tribe of *Chanah*, which at that time was a large clan, collected from various places, and sent a person to bring intelligence (of the Moslems) ; he arrived when the forces of the Arabs were arranged behind, *Bin Cassim* engaged in prayer, and in their devotions obeying the postures of the *Moollah*, he reported to his tribe, that those who could, by thousands be made to obey one man, it would be futile to oppose. Thus they determined to declare allegiance to the Moslems, and after sending suitable presents they arrived when *Bin Cassim* was at table, who said "This tribe is fortunate," and they were ever after styled the tribe of '*Chanah Mirzook*,' or 'fortunate ;' they then proffered their obedience and assistance of tribute, which was accepted, and they departed,

The tribe of *Chanah* become obedient.

and it was decreed that the land on that side of the river in the possession of the tribe of Chanah, should be taxed at a tenth, the same as that at *Neirunkót*, where the people had voluntarily tendered their obedience. In short, pursuant to the orders of *Hijaj, Bin Cassim* returned, and having crossed the *Mihran*, arrived at the fort of *Rawur*

Governor of Rawur
and Jeyur joins Bin
Cassim.

and Jeyur, where he sent an order to the governor *Múkih Bin Bisayah* to come and proffer his obedience. He replied, "If I do so I incur the displeasure of *Dahir*; in a certain place at uncertain time, I will come forward with a certain number of troops; direct your men to attack me, and I will appear to oppose them, and then allow myself to be taken prisoner." Thus did *Mukih* at that place become obedient, and was taken into great favor: he shewed the road (to conquest.)

They relate that the *Rahi Dahir*, hearing of the power of the army of Islam, prepared with a large force to oppose the passage of the river. A party of the Moslems were crossing, *Dahir* himself killed one with an arrow. He left *Jahamin Budah* there, and himself retired; *Jahamin* took such strong possession of the passage of the river, that it became difficult. At this junction *Chundram Halah*, who was formerly governor, seized

Dahir opposes the
passage of the Mos-
lems on the Indus.

Rebellion at Sewis-
tan.

Sewistan from a party of horsemen of the Moslems who were left at that place. *Mahamed Cassim* on hearing this, despatched *Ussúb Bin Abdul Rahim* with a thousand horse and 200 foot to Sewistan. *Chundram* prepared to oppose them, and was defeated: he wished to escape to the fort, but the fort gates had in the mean time been closed, and he being frustrated, fell into the hands of the Moslems and was killed, (sent to perdition.) The Moslems then surrounded and took the fort, whence they rejoined Bin

Sewistan retaken,
and governor killed.

Cassim: Rahi Dahir sent his son *Jaisisih* to the fort of *Bát*, to stop the road of the army of Islam; about 50 days were thus passed, and the Moslems began to suffer want, such horses as died of starvation were eaten. *Dahir* sent

The Moslems suf-
fer for want of provi-
sions.

a messenger saying, "The state of your army is thus reported: if you wish well to yourselves I shall not oppose, but will perform my service (become obedient,) and you had better return." *Mahamed Bin Cassim* replied, "By the will of the Almighty, this country shall be a Mahomedan country, and until you come and proffer

obedience and pay the tribute of several years, I will never abandon my intentions respecting you." (I will never take my hands from you.) They say that *Hijaj* in hearing the news of the loss of the horses, des-

Hijaj sends reinforcements and orders delay in the important affairs of *Dahir*, but to pass to Bin Cassim.

the river quickly and settle them first. On the receipt of these injunctions, *Mahamed Bin Cassim* having arrived at Juhum, directed them to collect boats for the passage of the river, and to make a bridge. *Muki Bin Bisayah* collected several boats, and

Bridge of boats. filling them with sand and stones, and fastening them with wedges, made them firm one to the other. On this intelligence *Dahir* wrote to his son to arrest *Muki* by some means for his evincing such audacity. *Rail* the brother of *Muki* was with *Dahir*, and having formerly been an enemy to his brother, said, "Entrust this order to me, and I will go and bring my brother; I will moreover pledge myself to prevent the passage of the river." At this time, by the help of God, the army of Islam having prepared the boats began to cross, and with showers of arrows dispersed the Infidels who dared to oppose them on the opposite shore. A large party arrived on the other side, and having cleared the shore of their

The Moslems cross the river. enemies, took up a position, until the rest of the

army should have passed safely. It is said, that swift horsemen of the unbelievers, by travelling all night, conveyed the news to *Dahir* early the next morning: he was still asleep when they announced it; the groom roused *Dahir*, who, when he awoke from a tranquil sleep, was so much annoyed that he struck the messenger on the face so heavily with his slipper, that he died immediately. In short, *Dahir* being astonished and dismayed, knew not what to do: when *Mahamed Cassim* had crossed the whole of his army, he proclaimed to his troops—"The river is in our rear and the enemy in

Bin Cassim exhorts his troops. front: whoever is ready to yield his life, which act

will be rewarded with eternal felicity in such a cause, let him remain and have the honor of conflict; and any amongst you who, on second consideration, does not feel able to oppose the enemy, let him recollect that the road of flight is not open—he will assuredly fall into the hands of the Infidels, or else be drowned in the river, and thus suffer disgrace, which is the worst of all evils in religious

or worldly matters; but still, let these now take leave, for brave men determine either to conquer or die." Of the whole force only three persons, one under a pretence of an unprotected mother, another of a motherless daughter, and a third of want of means, left; the rest declared they were only anxious for battle.

At length Mahamed Bin Cassim perceiving the unanimity of his troops directed a march from that place, and from the fort of *Bat* arrived at *Rawur*; he arrived at a place called *Jeyur*. Now between *Rawur* and *Jeyur* there was a bay, on passing which they came in

First view of Da- sight of Dahir's forces; Mohazar Bin *Sabit Kisi*
bir's forces. with 2,000 and Mahamed *Ziad Abdi* with 1,000

troops, were directed to oppose them: they drove the enemy back. At this time, Dahir called Mahomed *Haris Allafi* and represented, "For advice in such a day as this have I protected you; now you must exert yourself and take charge of the advanced party." Mahomed *Haris* replied, "Indeed I acknowledge that I ought to exert myself to the utmost, but there is the necessity of opposing Mahomedans, and to become

The Allafi chief re- renegade, sell my religion for gold, to have on me
fuses to oppose the the blood of Mahomedans, and when I die to go to
army of Bin Cassim. perdition; spare me, I pray you, the performance of

these tasks: any other duty I will perform with my life." Dahir was disconcerted, and remained silent. He sent *Jaisisih* with a large party of troops to oppose the enemy, but after the loss of the greater portion he was defeated and returned. The next day the brother of *Múki* was appointed, but he secretly sent a message saying, "Take me in battle as you have done my brother:" and they did so. Thus for ten days in this way the Infidel forces came out to battle, and, being defeated, returned.

In the meantime the victorious Moslems besieged Dahir in his own Bin Cassim besieges stronghold, and on the 11th day, which was Thurs-
Ahor. day the 10th of the month *Ramzan* in the 93rd year of the *Hejira*, Dahir notwithstanding the prohibitions of the astrologers came out himself with a powerful force; he had 10,000 horse with armour, and 30,000 foot with many war elephants, (on one of which)

Dahir gives battle. *Dahir* was seated in a howdah with two beautiful girls handing him wine, and fanning him. They contended fiercely from morning until night, and the Moslems so plied their rockets and arrows that it could not be exceeded.

At first the army of Islam became confused ; *Mahamed Bin Cassim* became alarmed, and offered up prayers to the Most High, who favored him, and gave him at length the victory. They relate, that *Bin Dahir* had at all times during the battle an iron mace in his hand, with which he cleft the head of every horseman against whom he launched it ; but at length on the approach of the Arabs, when he wished to leave the battle, the war elephants became frightened at the rockets of the Moslem troops, and fell amongst their own soldiers, who were thus destroyed. A party of the Infidels demanded quarter, and said " The army of Dahir is now confident and careless ; give us troops and we

A party of the Infidels desert. will take them in the rear, and break their pride and strength." In this way the ground was cleared and the enemy broken.

By the power of the Almighty an arrow struck *Dahir* in the neck
Death of Dahir. and killed him ; they drew his elephant to the rear, but by chance the elephant stuck in the mud of the river, and they all tried to conceal the King's position. The army of the Infidels being defeated, the Moslems so guarded all the approaches that a bird could not have flown past. The Brahmins fell into the hands of *Keiss*, and to preserve their own lives reported the death of *Dahir*. At this time

Certain Brahmins reported the death of *Dahir*.

the two daughters of *Dahir* were captured by the Moslem troops. *Mahamed Bin Cassim* fearing lest *Dahir* should escape, caused a proclamation to be issued, that they should close to the rear to prevent the concealment of the enemy. *Keiss* hearing the proclamation called aloud on the Most High after the Mahomedan fashion, and the whole army taking it up, *Bin Cassim* became aware of the death of *Dahir*. He came with some of his warriors to the edge of the mud, and on the testimony of the Brahmins took the polluted body out ; he cut off the head and stuck it on a spear,

The body of *Dahir* discovered. shewing it to the daughters for their confirmation (of his death). He then directed, that the army should occupy itself all night in prayer and thanksgiving for the Divine favour, and in the morning of Friday he sent *Dahir's* head with his two daughters to the gate of the Fort. The defenders of the garrison declared it was false. *Sadi* the wife of *Dahir*, having from the top of the palace seen the head of her husband, became insensible, and uttering a loud cry, threw herself off (the palace :) in short, the people in the

fort opened the gates, and the Moslem army entered, and having erected

The Moslem army a sort of pulpit in the temple, performed the prayers
enter Alor. of Friday. They then took possession of the riches

and property of every kind, and constituted *Keiss* the keeper of these.
In the beginning of the month *Shawal* after the settlement of all that
territory, they sent the head of *Dahir* with his daughters, the prisoners,
and the wealth with 40 horsemen accompanied by *Keiss* to the *Khali-*

Dahir ruled for 33 fat capital. The period of the rule of *Dahir* was 33
years, and the *Brah-* years, and the whole time occupied by the dynasty
mins, 92.

of the *Brahmins* was 92 years.

It is related, that after the death of *Dahir* the men of *Samah* from the
neighbourhood of *Thurri** having collected, came with tabours and
clarions and proffered their allegiance, and began to dance: *Maha-*
med Cassim asked who they were, and what they were doing. They
replied, "This is our custom, that when a Monarch is victorious, we
thus testify our joy." They returned. And the *Bhattias*, *Lohanas*, *Sa-*
hutahts, *Jundurs*, *Machees*, and *Kurejurs*†, introduced by *Alli Maha-*

Tribes who pay
homage to Bin Cas-
sim.

med Bin Abdul Rihman, came to pay their respects,
with head and feet bare. After their pardon had been
pronounced, it was decreed that whenever any of the
Mahomedans should come from the Capital of the *Khalifs* or go in that
direction, these tribes should be their guides and be answerable for
their safety.

Then *Mahamed Bin Cassim*, with the sanction of *Hijaj*, took to wife
the sister of *Dahir*, (whom the latter had married through fear of
losing his country,) and proceeded to acquire other territories. At this

Sons of *Dahir* re-
bel.

time at the commencement of the year 94, it was
announced that the sons of *Dahir* had possessed
themselves of the fort of "*Sikundar*," and had assumed indepen-
dence. *Mahamed Cassim* proceeded in that direction, and endea-
voured to reduce the fort; after many engagements he took complete
possession, destroyed the temples, and laid the foundation of *Mus-*
jids, and directed certain punishments to be inflicted on the inha-

* *Thurr* or *Thulli* the little desert separating *Sindh* from *Cutch*.

† These last are *Jhuttts*, the cultivators of the soil and rearers of cattle in contra-
distinction to the *Beloochees* who are foreigners; they are doubtless the aboriginal
Hindoos converted to *Islamism*.

bitants. He also in the same way subdued Barhamanabad; they say that one day *Mahamed Cassim* was sitting, when an assemblage

of Brahmins, about 1,000 in number with their heads and faces shaven, came into the camp. On enquiring their case, he learnt that they were mourning for their chiefs as is their custom. Having

called them, on the advice of *Sadi* the wife of *Dahir*, he sent them all as formerly to be collectors in the districts. In their helplessness they represented that they were a class of idol worshippers, and belonged to idol temples: "Now we have accepted obedience to you, and acknowledge our amenability to tribute, you must give us leave to erect our places of worship elsewhere, and to pray for the prosperity of the Khalif." *Mahamed Cassim*, after having represented the case to *Hijaj*, who reported it to the Khalif, gave the permission required, that they should act according to the usages of their ancient faith. He then ordered that, to distinguish them from other Hindoos, they should carry in their hands a small vessel of grain as mendicants, and should beg from door to door every morning. This custom still remains, and all the Brahmins carry the khulsal.

It is related, that when *Hijaj* heard of the conquest of the fort of *Sikundar* and Barhamanabad, he wrote to *Mahamed Cassim*, "Since by the blessing of the Almighty, *Dahir* and his country had been taken, you must also take the Capital city; and not rest satisfied with that, but turn to the east and proceed towards Hind, and by the blessing of the Mahomedan religion it will every where protect the Moslems. On this order, *Mahamed Cassim* set about the settlement of *Alor*.

In the disorder of affairs, news arrived that a son of *Dahir* was strong at *Alor*, having denied the death of *Dahir*, and reporting that he was only lost from his troops, and had gone towards Hindostan

whence he would soon arrive with an army and take revenge. So implicitly did he believe this, that whoever mentioned the killing of his father to him, was destroyed. Thus few alluded to the subject in his presence. He called to him his brothers *Jaisih* and *Wukiah*, who in the tumult of affairs had been dispersed. Bin Cassim proceeded in that direction, and besieged the fort of *Alor*; he sent *Sadi* the wife of *Dahir* to the gate of the fort, in order that she might explain the

death of *Dahir*. They called her a liar and stoned her, saying "You have become one of the eaters of cows." The siege was prosecuted, and the inhabitants of Alor soon began to suffer for want of food; they meditated surrender, *Fufi* began to think that there was no chance of his succeeding, but a false hope prevented his withdrawing. They say, that there was a sorceress in that place; they requested her to give them intelligence of the death of *Dahir*. This woman, whose name was *Jokiu*, asked for one night's delay, and after that she came into the presence of *Fufi* with two green branches of *Jow* and *Filful* trees and said, "I have searched every span of earth from *Sirundip*, and have brought this reply, that if *Dahir* were alive I should certainly have seen him; do not entertain the idea, and do not heedlessly and unprofitably doom yourself to destruction." When *Fufi* knew for certain from the sorceress, and became convinced of the death of *Dahir*, he left the fort at night and fled to his brothers whom he had called to him, but who had not yet arrived. In the morning the *Allafs* sent the intelligence by letter to *Mahamed Cassim*, and called for a promise

Bin Cassim enters of pardon for themselves; they directed the holders of Alor. the fort to open it, and *Mahamed Cassim* with his victorious army entered the city. He saw a large assemblage of the people prostrating themselves in the place of worship; he asked what they were doing, he learnt that they were paying adoration to an idol, and entering the temple he saw a well-formed figure of a man on horseback: he drew his sword to strike him, but those who were near him cried out, "It is an idol and not a living being." Making way for *Mahamed Cassim* he advanced to the Idol, and taking off one of his gauntlets he said to the

Bin Cassim reproach- spectators, "See in the hand of the Idol there is this es the idolaters. one gauntlet; ask him what he has done with the other." They replied, "What should an Idol know of these things." *Bin Cassim* said, yours is a curious object of worship, who knows nothing even of himself. They were ashamed at this rebuke. In short, after the capture of *Alor* which was the capital of the country, the rest of the dependencies became tranquil, all the inhabitants were grateful to *Bin Cassim**, and pursued their former avocations. He appointed *Hurün*

* There is an apparent inconsistency in our author here, for he tells us that Alor was taken by *Bin Cassim* when *Dahir* was overthrown, and does not account for the Rajah's sons getting possession of it, and its being necessary to recapture it. *Bin*

Bin Keiss, Bin Rowah Assidi, to the governorship of Alor, and the rank of Cazi he conferred on *Mussa Bin Yakrib, Bin*

Various governors appointed.

Tahi, Bin Nishban, Bin Ashman Sakufti, and he appointed *Widah Bin Ahmid al Nijdi* to the command of Barhamanabad, and *Nobah bin Daras* to the fort of *Rawur*, and the country of Korah he gave to *Bazil Bin Hillazuwi*. Then he turned towards Multan; and in the course of the journey, at the fort of *Bahiyah, Kulsur Bin Chundur, Bin Tillabij* a cousin of *Dahir's*, who had been at enmity with *Dahir*, and was remaining at that place, came out and tendered his allegiance. After that, they conquered the fort of Sukkur, and *Atta Bin Jamahi* was left there as Governor, and having seized *Multan* with its dependencies and fortified places, *Khazimah Bin Abdul Mulk, Bin Jumim* was left at Mahpur, and *Daud Bin Mussarpur, Bin Walid Himmani*, was appointed to *Multan*. *Mahamed Cassim* then

Mahamed Cassim extends his conquests.

proceeded towards *Dibalpur*, and he had at that time nearly 50,000 horse and foot under his banners, independent of his former regular army; in short, he conquered as far as the confines of *Kunnoj* and *Cashmir*, and saw those two cypress trees which had been placed by *Dahir*.

Everywhere he left trust-worthy agents and returned to *Yassur** where it was decreed by fate that his life should terminate.

(To be continued.)

Cassim had otherwise proved himself too good a General not to have provided for the security of the Capital of the country when once in his power to render its falling into the hands of the enemy at all likely.

* In the Chach Nameh "Hadapoor."

Védánta-Sara, or Essence of the Védánta, an introduction into the Védánta Philosophy by Sadánanda Parivrájakáchárya, translated from the original Sanscrit by E. ROER, Librarian to the Asiatic Society of Bengal.

PREFACE.

Of the Védánta-Sara two translations have already been published, one by Mr. Ward, (in his work View of the History, Literature and Mythology of the Hindoos) and the other in the German language, by the late Professor O. Frank. Ward's translation, which is evidently not taken from the Sanscrit, is very far from conveying a fair likeness of the original to the reader, and I need only quote the opinion of Colebrooke with regard to it, to prove its entire failure as a correct rendering of the original*.

The German for which we are indebted to O. Frank, was published together with the original text, in 1835; but, however creditable it is to the author, it is also inexact as a translation. Although a good Sanscrit scholar, and one of the first in Europe, who devoted his talents to that language, he had to struggle with the difficulty of ascertaining the real value of its technical terms, a difficulty which he had hardly the means of removing; for in Professor Wilson's excellent Sanscrit Dictionary, only a few philosophical terms are explained, and without an explanation of such terms by pundits, or an extensive course of reading, the

* Transactions of the Royal Asiatic Society Vol. II, p. 9. note. Mr. Ward has given, in the fourth volume of his View of the History, Literature and Mythology of the Hindoos (third edition,) a translation of the Védánta-Sara. I wish to speak as gently as I can of Mr. Ward's performance, but having collated this, I am bound to say, it is no version of the original text, and seems to have been made from an oral exposition through the medium of a different language, probably the Bengalese. This will be evident to the Oriental Scholar on the slightest comparison, for example the introduction, which does not correspond with the original in so much as a single word, the name of the author's preceptor alone excepted; nor is there a word of the translated introduction countenanced by any of the commentaries. At the commencement of the treatise too, where the requisite qualifications of a student are enumerated, Mr. Ward makes his author say, that a person, possessing those qualifications, is an heir to the Veda; there is no term in the text, nor in the commentaries, which could suggest the notion of heir, unless Mr. Ward has so translated *adhicari*, (a competent or qualified person) which in Bengalese signifies proprietor, or with the epithet *uttara*, *uttara adhicari*, heir or successor. It would be needless to pursue the comparison further. The meaning of the original is certainly not to be gathered from such translations as this, and (as Mr. Ward terms them) of other principal works of the Hindoos, which he has presented to the public.

exact metaphysical meaning of them must remain problematical. Besides O. Frank is the disciple of a particular philosophical school, that of Hegel, and has very often coloured the ideas of the original so as to correspond with his own system. I hope, therefore, that I have not undertaken a useless task, in bringing before the public a third translation, in which it has been my constant endeavor to render the original as faithfully as possible. For the language of this translation, I have as a foreigner to solicit the indulgence of the reader; and, independently of other considerations, it will be remembered, that English in itself presents difficulties, in rendering with exactitude the real force and meaning of Sanscrit philosophical terms. As regards, however, the language of the preface, I am much indebted to the valuable assistance of Mr. H. Torrens, V. P. and Secretary to the Asiatic Society, and I take this opportunity of acknowledging my great obligations to him.

In publishing this translation, it is my principal object to attract the attention of the public once more to a branch of Hindoo learning, which, successfully cultivated as it was by Colebrooke, has been of late almost entirely neglected. The researches of that eminent scholar, as in other departments, were also with regard to the philosophy of the Hindoos, of the most comprehensive character. He not only gave a general sketch of the different systems of their philosophy, but also a critical introduction into this branch of Hindoo literature, almost entirely unknown before his day. As his labors then created extensive interest in Europe, it is much to be regretted, that these researches were afterwards but lamely followed up. The Germans indeed did as much as the want of material allowed them. I here allude to the researches of the two Schlegels (Fr. and A. W. von) W. V. Humboldt, Ritter, (in his History of Philosophy) O. Frank, Lassen and others, who published either original texts, or translations, or critical treatises. But however meritorious these labors were, most of them, as founded upon Colebrooke's works, could not much enlarge our information on Hindoo philosophy. For this object the publication of Sanscrit texts, or translations was necessary, which were looked for chiefly from India and England. Here, however, it appears, that the interest in Hindoo philosophy was only enforced by the name of Colebrooke, as with him almost all further investigation ceased; for, with the exception of Professor Wilson, who edited Colebrooke's translation of the Sankhya

Karika, and translated the native commentaries on this work, no one has published any work of importance with regard to Hindoo philosophy. Without endeavoring here to enlarge on the causes of this neglect, I must not omit to touch on the principal one—the want of encouragement, with which philosophical researches are met in England. The study of philosophy is of its very nature adapted but to few; but even they will be deterred from it, if that part of the public, to which they are to communicate the results of their enquiries, is totally indifferent to them. If philosophy generally be but in little repute in England, it is easy to conclude, what must be the neglect of the systems of the Hindoos in particular, which, it appears, are entirely superseded by the much more elaborate systems of Europe. The Hindoos, it is said, are acute enough in nominal distinctions, but their enquiries, originating from an absurd and gross superstition, recur only to this root, instead of explaining the phenomena of nature. Without entering into a full discussion of this subject, I may be allowed to observe, that this view would at once destroy all historical study. On account of their historical interest, we not only direct our attention to the works of Grecian art, but also to those of Egypt, Etruria, Persia, Peru and of other countries, because they show us the characters of those nations in different states of civilization. If these possess a general interest, Hindoo philosophy is a monument, which must claim the attention of every enquiring mind, as it reveals to us the inmost character of the nation, closely interwoven as it is with all institutions of public and domestic life, with their literature, religion and their views of the means, by which their moral welfare might be advanced or retarded. But waiving this general interest, we must be aware of the connexion of Hindoo philosophy with the development of European science, by the new platonic philosophy, which evidently contains the principles and results of Hindoo philosophy, a connexion which can be only fully understood, when we know more of the history of the Hindoo systems.*

The *Védánta-Sara* is an abstract of the doctrines of the *Védánta* philosophy, and expounds more particularly those tenets which are ascribed by Colebrooke to the modern branch of this school. It comprehends in a very condensed form the whole range of the topics, which are discussed more fully in the different works of this school. The ob-

* Ritter's *Geschichte der Philosophie*. Vol. 4, p. 44.

scurity, which prevails in some passages, is rather owing to the concentration than to the indistinctness of the ideas. The principles of the system are clearly laid down, and though in a few passages there is a deviation from them, they are never lost sight of. Other philosophical systems are only touched upon, when it is the object to prove their principles to be entirely inconsistent with themselves and with each other. The demonstrations, though short, are perspicuous, and sometimes even elegant. The illustrations are generally well selected and striking; and, if we consider the work to be rather of a descriptive than of a argumentative character, we must acknowledge, that it is a most excellent introduction to the study of that philosophy.

The following exposition is intended to place before the reader the chief metaphysical topics of this work and to compare the doctrines, explained in it, with those philosophical systems, Hindoo as well as European, with which it has an affinity in its principles. There exists according to it only one eternal and unchangeable being, who has the attributes of existence and consciousness. The manifold distinctions in what may be called, the material and intellectual worlds, are together with those worlds, mere *εἶδωλα*, produced by unconsciousness,* (which objective is something analogous with matter, and subjective a want of clear perception of the unreality of all material objects.) For example, if you reflect on the reality of the world, you find it has none, because it is changeable throughout; all reality is centred in one being, who is beyond change, and concerning whom there is not even change or plurality of ideas, as it includes no distinctions in itself. Thus of the supposed reality of the world, nothing remains; naught exists but mere *εἶδωλα*, which, in contradistinction with the knowledge of Brahma (or of the infinite being without plurality,) may be called ignorance or unconsciousness. It is the principal work of philosophy to destroy this ignorance, or to unite our finite being with the infinite Brahma, or in the words of the Védánta, to know ourselves as Brahma. It

* The words consciousness and unconsciousness do not express the full meaning of the corresponding Sanscrit words. Consciousness means the knowledge of what passes in the mind, that is, a reflected knowledge, while the Sanscrit term refers to knowledge in general. As Colebrooke, however, has used in his essay those words, I thought it better not to introduce another terminology, and have only to remind the reader, that consciousness and unconsciousness are here always to be understood in the more comprehensive sense.

is, however, impossible for any individual immediately to obtain this true knowledge, as any idea, which we may conceive of Brahma, previous to the performance of the conditions, conducive to that knowledge, must be one of the various illusions, which are created by ignorance in our minds. The true knowledge can only be obtained by a systematic method, which is twofold, theoretical and practical. The theoretical method is the direction of there flective power upon Brahma, and it proceeds first synthetically from the infinite substance to the εἰδωλα or appearances, showing the various modes, in which Brahma is successively represented by unconsciousness; and secondly analytically, from the manifold creations of unconsciousness to the infinite substance, successively showing the unreality of them and returning to Bramha as the only source of reality. The practical method presents the means, by which our senses, passions, and thoughts are subdued; the mind is gradually detached from worldly concerns, directed to the performance of good acts alone, and finally fixed upon the contemplation of God.

It is remarkable, how in the principle itself the fallacy of the system is manifest. If Bramha be the only real being, all other things (material or immaterial) are unreal, and this inference is expressly recognized, there should be not even the appearance of an existence of them; but it is also said, that those things must not be considered as nothing; so that they have, to say so, a kind of imperfect existence, but still an existence, which cannot be derived from the infinite Bramha. In short, there is not *one* principle, but, against the express assertion of the Védānta, *two* principles, the infinite, unchangeable, omniscient being, and the finite, changeable and unconscious being. This is also evident from the consequences; for the world or its appearance is not produced either by Bramha or by unconsciousness, but by their mutual causality; for in Bramha only, when clouded by the mists of ignorance, is the spectacle of a world produced. According to this exposition of the theory, which must, I think, be allowed to be correct, Bramha would coincide with the notion, which occidental philosophers form of substance, and unconsciousness with that of attributes and modes.

What is called unconsciousness, has, however, a twofold meaning; according to one, it is delusive appearance, by which unreal things are represented as real; according to the other, it is the origin of the actual world. We shall consider only this second meaning, which we

will endeavour clearly to define. It is evident, that an adequate notion of that origin can only be obtained from its productions, as the nature of the cause is perceived by the nature of its effects, and this mode of inference we may the more insist upon, as the inductive process is recommended by the system as one of the means, whereby to arrive at true knowledge. Now the Védántists hold, that unconsciousness causes the emanation of five elements, ether (*ákása*,) air, fire, water and earth. These elements, though subtile and imperceptible to the senses, have material qualities, and are therefore themselves special kinds of matter. To know their origin, we have then to divest them of their special qualities, by which we arrive at the notion of matter in general (separated from all differences of space and time,) and we must therefore say, that unconsciousness and the general notion of matter are virtually the same, a necessary inference, however, but one which the Védántists took care to avoid, because the vague notion of unconsciousness suited admirably as a cloak to the radical error of their system.

As it is here my object to place before the reader the most prominent characteristics only of the system, I am not to enter into the various emanations from unconsciousness, but will at once state the opinion, which the Védánta forms as to the highest form of knowledge, to which the individual mind can aspire, and which in fact is a consequence, necessarily derived from the first principles of the system. When we have perceived, that all the emanations of unconsciousness are unreal, when we are able to distinguish in the universal as well as in the individual soul, that which is real and eternal from the unreal and the transient, then is our notion of Bramha firmly and adequately established, in the knowledge, that the individual soul is the same with the eternal Bramha, as the differences, which at first sight seemed to exist between them, became gradually destroyed by the progress of reflection. But even this adequate notion of Bramha, as an act of the mind, is included in the emanations of unconsciousness, and it is therefore an unavoidable inference, that this act also, when once arrived at, should be destroyed as one, though the purest and highest, of the emanations of unconsciousness, when the individual soul, comprehending its reality, returns to Bramha, with whom it is identical.

The philosophy of the Védánta, as explained in the Védánta-Sara, differs undoubtedly from the more ancient expositions of this doctrine,

and I fully concur in Colebrooke's opinion, that the attempt to proclaim the material world as mere illusion, had not originated with the founders of the Védánta. The centre on which all Hindoo philosophy depends, is the opposition between the phenomena of the mind and of the body, by which they were led even in early times, as it appears, to maintain the existence of two principles, soul and matter.* This is likewise observable in the Védánta; soul and matter, though produced from one and the same substance, are at first real productions, which have the same claim to existence, and only at a later period, when on comparison of both with the substantia absoluta their reality came to be questioned, the reality of matter was denied, and the expedient of an illusion was resorted to, in order to explain its existence.

The Védánta in general differs from the Sankhya; the two systems assimilate *in their explanation of productions of the material world*; but while the Sankhya lays down the original independent existence of spirit and of matter, the Védánta derives both from one and the same substance, in which their differences are destroyed. The two schools of the Védánta, the ancient and modern, agree as to this substantia absoluta; the material productions, however, derived from it, though created in the same successive order, are differently explained; they are real productions according to the ancient school, while the modern one believes them to be a mere illusion, produced by unconsciousness.

Among the various systems of the Greeks, we can only find that of the Eleates, with which we may compare the principles of the Védánta. We there perceive the same all comprehensive substance, which has the same attribute of eternal, unchangeable existence which is without differences, either with regard to itself or others, and the sole attribute of which is thought. We also find in the disputes of the Eleate Zeno with other Greek philosophers the same inclination to consider all material things as mere illusion. But I abstain from further comparison of the systems, as the Védánta treats of the subject matter synthetically as well as by analysis, whereas the Eleate school has confined itself wholly to the latter process.

The modern Védánta bears the closest affinity to the system of Spi-

* Though it appears a matter of course, that all philosophers should commence from these principles, history shows the reverse. Thus, Greek philosophy was at its commencement entirely physical.

noza. His Bramha is that infinite substance with infinite attributes, beside which there is nought else existing, though he so far differs from the modern Védántists as to assign to it two attributes, that of thought, and that of extension, which the Védántists of that school deny the existence of.

They maintain a perfect Ens or a real unity without any element of opposite qualities. Spinoza indeed asserts, that his Ens Cogitans is identical with the Ens Extensum, difference existing only in the perception of the whole under the one or under the other attribute; but on the other hand he also asserts, that each attribute must be understood of itself, that is to say, that it has no relation whatever to any other attribute.* Though the Védánta philosophy in this instance is evidently more strict in the definition of the principle, it deviates from the original purity of its notion, when attempting to explain the phenomena of its world.

Both systems present likewise a singular coincidence in the mode, by which they connect finite things with infinite substance. Spinoza declares it altogether impossible to derive finite things from infinite substance, because any finite substance is only finite, if determined by another substance of the same kind, that is, infinite substance is always co-existent with finite things.† The Védánta-Sara maintains also, that the perception of Bramha as one whole or as many parts, depends merely on the accident of that perception; if perceived as one, it would be one; if perceived as many, it would be many; but in the latter case the unity of entity would be in no sort destroyed or altered. Here likewise we find a plurality of material objects, not derived from the one whole (which has the attributes of infinity, eternity, &c.) but co-existent in it, so

* Though it should be hardly necessary to make quotations in such a general sketch as this, still it may be not found useless to confirm some of the above assertions. Per attributum intelligo id, quod intellectum de substantia percipit, tanquam ejus essentiam constituens. Spin. Eth. I. Def. 4. Unumquodque unius substantiæ attributum per se concipi debet. Eth. Prop. 10. Duæ attributa, realiter distincta, per se concipiuntur, idest, unum sine ope alterius. Eth. Def. 3.

† Quodcunque singulare sive quavis res, quæ finita est et determinatam hæbet existentiam, non potest existere nec ad operandum determinari, nisi ad existendum et operandum determinetur ab alia causa, quæ etiam finita est, et determinatam habet existentiam; et rursus hæc causam non potest etiam existere, neque ad operandum determinari, nisi ab alia, quæ etiam finita est et determinetur ad existendum et operandum, et sic in infinitum. Eth. I. Prop. 28.

that both views are essentially the same: this way of reasoning, however, must not be applied to the pure Bramha. Here then both systems differ, and if we must assign to the Védánta the meed of greater purity in its principle, we must expressly state, that in the development of the system Spinoza is as infinitely superior to the Védánta as the science of his time was to that of the Hindoos generally.

It is easy also to find many points of resemblance between the modern Védánta and the doctrines of Fichte* and Schelling; as the world, being a production of Maya, or unconsciousness, and according to Fichte, being a phenomenon of the Ego in its different modes of considering itself, and Schelling's negation of the nothing by the absolute substance, his absolute Selbstbejahung, compared with the infinite Bramha, without whom nothing exists, are ideas closely related; but we abstain from further comparisons and conclude this introduction with some remarks on Hindoo philosophy in general.

We must acknowledge the ingenuity and originality of thought, by which this system was brought forth. It is evidently not a primitive notion of the mind, such as might almost arbitrarily assign a general cause to certain phenomena, which provoke reflection. It is an elaborate system, in which the principle and the method are clearly defined, and the inferences are fairly deduced, and compared with the original impulses, by which reflection was called forth. It is also evident, that such a doctrine, especially as it was considered as the last goal of perfection by all classes, must have had a powerful influence in the formation of individual character as well as on the civilisation of the people; for to obtain its final object, purity of the moral character was indispensable. It is, to confess the truth, a philosophical system, elevated, far above the crude notions, connected with national superstitions, above the prejudices of caste, as well as above the formalities of ceremonial worship; for the supreme substance is only known by a continued

* Fichte, in asserting that the external objects are merely productions of the ego, appears to be most closely connected with the modern Védánta. This is, however, not the case. The Védántists maintain the world to be appearance, because it cannot be considered as real: Fichte, on the contrary, from its being a mere appearance in the Ego, argues its unreality. This Ego moreover, as the identity of subject and object, is very different from any doctrine in the Védánta, and the idealistic principle, from which it appears to proceed, is only pretended, as the phenomena of nature are in fact derived from a realistic basis.

and methodical direction of the reflective power of the mind upon it, and the Sankhya expressly asserts, that the religious ceremonies and doctrines of the Védas are not sufficient for final salvation.* It is, however, not surprising, that similar effects were not produced by the philosophy of the Hindoos, as by that of the Greeks. In Greece no caste existed; men of science rose from all classes of the people, and the work of the higher faculties of the mind was not restricted to the priests. When therefore philosophers found the religious doctrines of their people inconsistent with sound reason and morality, they did not hesitate to pronounce them as such, and to demonstrate their pernicious effects upon the moral and religious principles of the people.† In India, on the contrary, the cultivation of science was incumbent on the priests alone, and if the results of their enquiries were strongly opposed to the religious prejudices of the people, their whole position most forcibly recommended them to conceal what they considered truths, because destructive of those very prejudices, whence they derived their privileges and subsistence. Thus influenced on the one side by the power of truth to the revelation of their opinions, on the other by worldly advantages to their concealment, they followed a middle course, that is, they endeavored to reconcile the tenets of religion with their philosophical views, without deserting the consistency of their principles. By this proceeding must religion, of course have been degraded from its state of sublime agency, as advancing the best interests of mankind, to becoming the base instrument of delusion on uncultivated minds, while philosophy lost its dignity and genuine character, being mixed up with a corrupt theology, and the distance between the learned and the people in general became the wider. It was only one of the consequences of such a position, that the common people by nature and law were unfit to enjoy the knowledge possessed by the privileged castes. Owing to the exclusiveness of science it is another consequence, that philosophy in India was more directed to theoretical contemplation than to practical purposes; the Greeks as well as the modern European

* This is in fact also maintained by the Védánta, absorption into Brahma being the final end of an individual intelligence, and all efforts which are not directed to this end, retarding it in a more or less degree.

† Sextus Empir. Adv. Math., where he speaks about Xenophanes, and Clem. Alex. Chrom. V. Xenophanes; but the principal passage, and perhaps the best, what has been said on the pernicious results of polytheism, Plat. Repub. Lib. II.

nations, on the contrary, bestowed the same attention upon practical as on abstract questions; for while, according to the one, it is a duty of mankind to remain in social connexion, a duty which should even be enforced, it is, according to the other, the highest privilege of the wise to separate himself from all social connexions, to endeavour at a total abdication of the impulses and motives for action, which the world or our ourselves can present, until the soul has arrived at that condition, in which it returns to the source of all truth and reality, and in which the individual becomes annihilated by absorption into the great origin of all things, who is all, and in whom all are included.

Salutation to Ganésha.

For the accomplishment of my desire I take refuge to the soul, infinite in reality, in knowledge and in bliss,* the place of the universe, which neither by word nor thought can be approached.

Having worshipped my teacher *Advyānanda*,† who by overcoming the notion of duality, is in truth so named, I shall expound the Essence of the Védānta according to my understanding.

The name of Védānta applies to such arguments as are taken from Védānta. the Upanishads‡ to the Shārīrikasūtras§ and other similar Shastras, which tend to the same end.

As this work is an introduction to the Védānta, it need not separately explain the categories, by which the Védānta is अनुबन्धः completed. There are four categories in the Védānta, the qualified person, the object, the connection, and the final end.

* This may also be translated, "the infinite, eternal, omniscient, blissful soul," or "the soul, which is the bliss of infinite being, and knowledge." I here observe, that the soul is not something different from those predicates, but the identity of reality, knowledge and bliss.

† Advyānanda means who finds his felicity in non-duality.

‡ Upanishad, the theological part of the Védānta, or argumentative part of the Védas. Wilson. The commentator, Rāmakrishna Tīrtha remarks, that it is the object of the Upanishads to explain the unity of the universal and the individual soul.

§ The Sārīrika, Mīmāṃsa, Brahme-sūtra or Sārīra-sūtra, above mentioned, is a collection of succinct aphorisms, attributed to Bādarāyana, who is the same with Vyāsa, or Védavyāsa, also called Dwaipāyana or Crishna-dwaipāyana. Colebrooke, Tr. R. A. Soc. Vol. II, p. 3.

A qualified person is he, who by the perusal, as it is prescribed, *Qualified person.* of the Védas and Védāngas having first obtained अधिकारी the true sense of all the Védas, who in this or a former life having renounced the objects of desire, and the works which are forbidden, who by observing the daily ceremonies as well as those prescribed on certain occasions, the expiations and acts of internal worship, being liberated from all sin, and therefore thoroughly purified in his mind, and who having performed the four means, has become perfect in knowledge.

Objects of desire, as for instance the Jyótishtómas*, are such as are *Objects of desire.*

काम्यानि
and of aversion.

निषिद्धानि
Daily ceremonies.

नित्यनि
Ceremonies on certain occasions.

नैमित्तिकानि
Expiations.

प्रायश्चित्तानि
Acts of worship.

उपासनानि

means of obtaining heaven and other desirable objects ; prohibited is what causes (the punishment of) hell and other undesirable objects, as for instance the killing of a Bramhan. Daily ceremonies are for instance the *Shandhyābandana*† which to omit is the cause of sin. Ceremonies on certain occasions are for instance the *Jatéshtya* and others for the birth of a son. Expiations are for instance the *Chandrāyanas*,‡ which are causes of removing sin. Acts of internal worship, for instance such as originated from *Shandilya*, are actions of the mind, whose object is *Bramha*, united with the three qualities. The principal fruit of the daily ceremonies is the purification of the mind, that of the acts of internal worship is the fixing of the mind upon *Bramha*.

“ It is him, whom the Bramhans by the word of the Védas and by religious austerities wish to comprehend,” says the *Sruti*.

“ By austerities sin is destroyed ; by knowledge, immortality obtained,” says the *Sruti*.

* A particular sacrifice, at which sixteen officiating priests are required. Wilson's Sanscrit Dict.

† Religious abstraction, meditation, repetition of Mantras, sipping of water, &c to be performed by the three first classes of Hindoos at particular and stated periods in the course of every day, especially at sunrise, sunset, and also, though not essentially, at noon. Wil. S. D.

‡ A religious or expiatory observance regulated by the moon's age, diminishing the daily consumption of food every day by one mouthful, for the dark half of the moon, and increasing it in like manner during the light half. Wil. S. D.

The secondary fruit of the daily ceremonies, of those enjoined on certain occasions, and of the acts of internal worship, is the gaining of the world of the forefathers and of the celestials.

“By works the first is obtained, by knowledge the latter,” says the Sruti.

Means are : First, the distinction of the real from the unreal thing ;

Means.

Secondly, the disregard of the enjoyment of fruits

साधनानि

(arising from works) as well in this as in a future life ;

Thirdly, tranquillity of mind, self-restraint, &c. ; Fourthly, the desire of emancipation.

The distinction of the real from the unreal thing, is to know, that

नित्यानित्य

Bramha is the real thing, and beside him all is

वस्तु विवेकः

unreal. Disregard of the enjoyment of the fruits,

*Distinction of the real
from the unreal thing.*

arising from works, in this as well as in a future

*Disregard of enjoy-
ment in this as well as in
another world.*

life, is entirely to renounce the enjoyment of

things of this world, as for instance, of wreaths or

sandelwood, &c. which are transient, because they

must be obtained by works, as well as to renounce

the enjoyment of things of another world, as for instance, of the juice of immortality, &c., because they are also transient.

Means of self-command are, *a.* tranquillity of mind, *b.* self-restraint, *c.*

Means of self-command.

Tranquillity of mind.

resting, *d.* endurance, *e.* religious contemplation

and *f.* faith. Tranquillity of mind is the refraining

शमः

of the mind from objects of the ear and the other

senses, with the exception of such objects as refer to Bramha, (Bramha as united with the three qualities) self-restraint is the coercion of the

Self-restraint.

external senses from all objects, with the exception

दमः

of such as refer to Bramha. Resting is to rest from

Resting.

all objects, when returning (into the mind) with

उपरतिः

exception of such as refer to Bramha, or to abandon,

according to prescribed rules, all works that are enjoined. Endurance

Endurance.

is the sustaining of cold and warm, and of all those

सहिष्णुता

sensations that have their contrary ones.

Religious contemplation is to keep the mind fixed upon the hearing

Religious contemplation.

&c. of Bramha, and upon such objects by which

समाधिः

this is facilitated. Faith is belief in the words

of the spiritual guide and of the Védánta. Desire of emancipa-

Faith.

अथा

Desire of emancipation

मुमुक्षुत्वं

tion is the wish of liberation. He that is perfect in knowledge, having obtained this state of mind, is called a qualified person.

"Tranquil in mind and self-restrained," says the Sruti, and it is also observed, "To him who is tranquil in his mind, who has subdued his senses, whose sins are removed, who acts according to the precepts (of the Shastra) who abounds in virtues, who is a follower of the teacher and strives for emancipation, to such a one must always this (the Shastra) be given."

II. *Object*, (of the Védánta,) is the unity of the sentient soul and

Object.

विषयः

of Bramha, the soul in its pure state, as to be proved from arguments of the Védánta.

III. *Connection*, between that unity as object of knowledge, and

Connection.

सम्बन्धः

the Upanishads which explain it, is the relation between the object of knowledge and that which

makes it known.

IV. Final end is the destruction of the ignorance which obtains

Final end.

प्रयोजनं

with regard to the knowledge of that unity (of the individual and universal soul) and the gaining

of beatitude in accordance with his (Bramhás) being.

"Who knows the soul, overcomes misery," says the Sruti, and further,

"Who knows Bramha, becomes like Bramha."

That qualified person, being burned by the fire of birth, death and other worldly misery, as a person whose head is burning, takes refuge in the sea, repairs with offerings in his hand to the teacher who knows the Védas, and puts his faith in Bramha, and becomes his (the teacher's) follower.

"Holding (he) offerings in his hands, (repairs) to him who knows the Védas, and puts his faith in Bramha," says the Sruti.

II. *Object*. That teacher with deepest love instructs him by means of the improper transferring and of the true abstraction.*

"To him, when arrived, thus spoke the teacher," says the Sruti.

* Adhyarópa (the same with Arópa, Adhyásha, Bhrama) is literally "placing upon," and signifies error with regard to the infinite being.

Improper transferring is the placing of an unreal thing upon *Improper transferring*. the real thing, as the placing of (the notion of)

अध्यारोपः a snake upon a rope, which is not a snake.

The real thing is the eternal, omniscient, blissful Bramha, without

Real and unreal thing. duality. The unreal thing is all, that is in-

वस्तुवस्तु animate without consciousness.* The thing

अज्ञानं without consciousness is according to some what

Thing without consciousness.

cannot be explained by (the ideas of) existence or non-existence, according to others, the something, composed of the three qualities,† which exists, and obstructs knowledge.

I am ignorant, this and the like you perceive by reflection, and

Unity and multiplicity of the thing without consciousness. “you know the power of the soul, in which its own qualities are inherent,” says the Sruti. This

(something) without consciousness by the ideas of generality and speciality is perceived as one thing and many things. For as by the application of (the idea) of generality to trees the word forest in the singular number is perceived, or by the same notion

* Vide preface.

† **गुणः** Commonly translated, quality, but more adequately degree of material existence. Guna is likewise here in the text not a quality of the thing without consciousness, but the three Gunas are its actual being. A Guna, as being the source of all derived material existence, can consequently not be explained, but by its effects. Lassen renders these three modes of existence by—essentia, impetus, and caligo. Colebrooke, *Miscellaneous Essays*, Vol. I. p. 249, says, with regard to them: “The Sankhya, as other Indian systems of philosophy, is much engaged with the consideration of what is termed the three qualities, if indeed quality is the proper import of the term; for the Scholiast of Capila understands it as meaning, not quality or accident, but substance, a modification, fettering the soul, conformably with another acceptation of Guna, signifying a cord. The first and highest is goodness, (sattwa.) It is alleviating, enlightening, attended with pleasure and happiness; and virtue predominates in it. In fire it is prevalent, wherefore flame ascends, and sparks fly upwards. In man, when it abounds, as it does in beings of a superior order, it is the cause of virtue. The second and middlemost is foulness or passion, (rajas or téjas.) It is active, urgent and variable, attended with evil and misery. In air it predominates, wherefore wind moves transversely. In living beings, it is the cause of vice. The third and lowest is darkness, (tamas.) It is heavy and obstructive, attended with sorrow, dullness and illusion. In earth and water it predominates, wherefore they fall or tend downwards. In living beings it is the cause of stolidity. These three qualities are not mere accidents of nature, but are of its essence, and enter into its composition. We speak of the qualities of nature, as we do of the trees of a forest,” says the Sānchya.

many waters appear as a single thing, so by the application of the idea of generality to the unconscious things which are united with sentient souls and manifested by (the idea of) plurality, they appear as one single thing.

“Which is not produced, which is one” (ignorance, Maya,) says the Sruti.

In this universality (of unconsciousness) by being the attribute of the perfect one, is the principal quality, viz. that of goodness, prevailing; the soul in which this (universal unconsciousness) is inherent, and which has the attributes of omniscience, omnipotence, supreme government and other perfections, which is manifested by (the notions of) existence and non-existence, which is the all-pervading cause of the world, is
Supreme ruler.

ईश्वरः

called the supreme ruler. His omniscience arises from manifesting all that is without consciousness.

“Who knows all, is omniscient,” says the Sruti.

This universality (of unconsciousness) is the causal organism (of the
Causal organism.

कारणशरीरं

soul,) since it is the cause of the universe, it is the cause of blessedness, since it involves all bliss and has the quality of covering like a case; it is profound sleep, since it rests above all; it is therefore said to be the place of destruction of the subtile and gross expanses.

As by the application of (the idea of) speciality a forest is perceived as trees in the plural number, or water as many waters, so by the application of (the idea of) speciality the universal unconsciousness appears as many unconscious things.

“Bramha is by his Mâyās manifold,” says the Sruti.

In this instance by the application of universality and speciality arises the name of universality and speciality, (of unconsciousness.) This speciality of unconsciousness, by its being an attribute of the single soul, has the principal quality of goodness in its impure state. The soul, in which this (special unconsciousness) is inherent, and which has therefore the attributes of ignorance, subjection and other imperfections, is called the
Individual Intelligence.

प्राज्ञः

individual intelligence;* it has the attribute of partial knowledge, since it manifests only one

* I have rendered the Sanscrit term : **प्राज्ञः** by individual intelligence. The adequate version would be : who knows only a little, which is, however, in fact the same with the idea of an individual intelligence.

unconscious thing ; it is not able to manifest many, because it has the quality of indistinctness*. Since it (the special unconsciousness) is the cause of self†, and of other similar attributes, it is the causal organism (of the soul) as it includes all bliss, the case of blessedness, as it rests above all, profound sleep, therefore the place of destruction of the subtle and coarse organisms. In that state the supreme ruler and the individual intelligences enjoy by the subtle powers of unconsciousness, which are the manifestations of the soul, (perfect) blessedness.

“The individual intelligence, which is the same with the soul, enjoys bliss,” says the Sruti.

This is also confirmed by the fact, that one who awakes from sleep, makes the reflection,—Sleeping I was happy, I knew nothing.

There is no distinction between both the universality and speciality, (of unconsciousness) as there is none between forest and the trees, and water as one thing, and water as many waters. There is no distinction likewise between both, the supreme ruler and the individual intelligences, in which that universality and speciality are inherent, as there is none between the sky, which covers the forest and the trees, and between the sky which is reflected by the ocean and by many waters.

“That Ruler of all,” says the Sruti.

As there is for both the forest and the trees, and the sky, which is attributed to them, as well as the water and the waters, and the sky, reflected by them, another not attributed sky, which is the location of them, so is for both, the unconsciousness and the soul, in which it (the unconsciousness) is inherent, another soul which is not inherent, and which is called the fourth‡.

“They call him blessed, tranquil, without duality, the fourth,” says the Sruti.

* This indistinctness is produced, according to the Tīka, by the state in which the single soul is placed, viz., in which the first quality, being suppressed by the second and third qualities, cannot be clearly manifest.

† अहङ्कारः Self, more properly what produces self, the notion of egoity, the faculty or power to refer all perceptions and notions to a self, an ego.

‡ This term of the fourth will afterwards be explained.

This fourth, the soul in its pure state*, if, like a burning iron-ball, not distinguished from the unconsciousness and the soul, in which it is inherent, is the literal meaning of the great sentence, (viz., that art thou, which the teacher first addresses to his pupil) if distinguished, it is the real meaning of the great sentence.

The unconsciousness possesses two powers, the covering and the ill-
 Covering power of un- lusive†. The unconsciousness, though finite, hides
 consciousness.

अवरणशक्तिः by its covering power the infinite, incorporeal soul,
 by obstructing the mind of the observer, in the
 same way, as even a small cloud covers the orb of the sun, which extends many miles, by obstructing the direction of the eye of the observer.

Thus it is said, "As an ignorant man, the eye of whom is covered by a cloud, thinks the sun to be covered by a cloud and without radiance, so the self as soul, which is infinite knowledge, appears before the eye of the ignorant as constrained in limits."

When the soul is covered by this power, then arises the impression of dominion, possession, happiness, misery and of other notions, connected with material things, as from a rope, which is not perceived to be a rope (which is covered by its own ignorance) the idea of a snake

Illusive power.

विचेष्टशक्तिः is produced.—As the ignorance with regard to a
 rope, produces by its own power (the idea of) a
 snake and similar things upon a rope which is not perceived to be a rope (which is covered by its own ignorance) so shows the unconsciousness (ignorance) by its own power all the expanses of the universe upon the soul, which is covered by ignorance. This power is called the illusive power.

It is said, "The illusive power of ignorance creates the world from the internal organisms of Bramhá's egg."

* That is to say, considered in its absolute state, in which all differences and attributes are annihilated, and which can only be expressed by the notions of infinite existence and knowledge.

† There is this difference between the two powers, the one is negative, there is an absence of truth, because it is concealed; the second, however, is a creative power, it creates appearances, illusions which claim to be realities; the term illusive does not fully express the Sanscrit word, but I did not find a more adequate one.

The soul, in which the ignorance with its two powers is inherent, is by its own principality the instrumental cause*

Origin of the world.

(निमित्तं) and by the principality of its quality (ignorance) the material cause (उपादानं), as a spider by its own principality is the instrumental cause, and by the principality of its body the material cause of the web. From the soul, covered with unconsciousness, as illusive power, (the second power) in which the darkness (the third quality) prevails, is produced the ether,† from the ether the wind, from the wind the fire, from the fire the water, from the water the earth.

“From *this* soul, in which unconsciousness is inherent, the ether is produced,” says the Sruti. In the cause of them (the five elements,) darkness predominates on account of the prevalence of the inanimate in those elements; in that state are the three qualities, (truth, action and darkness) produced in the ether and the other elements according to the quality of their causes. Those subtile elements are called atoms (तन्मात्रं) and uncombined elements.

From them are produced the organisms and the gross elements. The subtile organisms are the seventeen organs, and the internal organisms. Those organs are the five intellectual senses, understanding and reason, the five organs of acting and the five internal airs. The intellectual senses are the ear, the sense of touch (skin,) the eyes the tongue and the nose. They are separately, according to their

Understanding.

बुद्धिः

Reason.

मनः

Thinking.

चित्तं

order, produced from the united parts of the first quality of those elements. *Understanding* is called the action of the mind, by which it asserts; *reason* that action of the mind, by which it doubts or decides; in both (actions) are *thinking* (चित्तं) and consciousness included; thinking is that action of the

* There are three kinds of causes, 1. Samavāyikārana, the same which is here called उपादानं, which signifies the elements, of which any substance may be produced, therefore material cause; 2. Asamavāyikārana, the actual union of the composing parts; 3. Nimitta Kārana, the instrument, by which an effect is produced; vide Bhasha Parichéda.

† आकाशः is the first element, in which all others are comprehended; according to the Bhasha Parichéda it is everywhere, and has, with the exception of the sound, the same attributes with time. In want of a more appropriate term ether perhaps expresses best its meaning.

Consciousness. mind, by which it examines ; consciousness, by which

अहंकारः

it perceives its actions as its own actions. They

are also produced by the united first qualities of those elements, which is evident from the fact, that they have the power to manifest.

The understanding together with the intellectual senses, forms the

Intelligent case of the soul.

intelligent case of the soul ; this (case) on account of its manifesting the impulses of dominion,

possession and pride, is called the administering sentient soul, the possessor of this and another world. The reason together with the organs of

Mental case of the soul.

action form the mental case. Organs of action are word, hand, foot, the organs of evacuation and

generation. They are separately according to their order, produced by

parts of the second quality. *The vital airs* are those of respiration,

of inspiration, of circulation, the guttural air and the equalizing air,

(of digestion.) The air of *respiration* (प्राणः) is going upwards

through the nose, that of *inspiration* (अप्राणः) going downwards to

the lower extremity of the intestine, that of *circulation* is diffused

throughout the whole body. The *guttural wind* (उदानः) moving

upwards turns back again, and has its place in the throat. The equalizing air (समानः)

passing through the middle of the body, equalizes the food, which is taken by eating or drinking ; to equalize is to digest

and to produce the different substances for assimilation or excretion.

Others maintain five airs, different from those above mentioned, viz. of

eructation, of winking, of digestion, of yawning and of nourishing. The

air of eructation (नागु) produces belching, that of winking (कृष्णः)

effects the closing of the eyes, &c. that of digestion (कृकरः) produces

hunger, that of yawning (देवदत्तः) produces yawning, that of nourishing

(धनञ्जयः) makes the body stout. Others assert, that the latter

five airs are included in the former classes. The five vital airs are

produced by the united second qualities of the five elements, and

Vital case.

form together with the acting organs the vital case ; it

is produced by parts of the second qualities, because it is living action.

Among those cases the intelligent case, having the faculty of

knowledge, is the ruling, the mental case, having the faculty of desire,

is the causal, and the *vital case*, having the faculty of action, is the

performer of works. The divisions of the cases are made according to

their fitness (for certain actions.) They are called, when united, the subtle organism of the soul. Here also becomes the whole subtle organism by being the object of One mind, universal organism like the forests and the sea, and by being the object of many minds, special organisms, like the trees and the waters. The soul, in which the

Hiranyagarbha. universality is inherent, is called (Hiranyagarbha)

the cause of himself, the sentient (conscious) being, because all things are arranged in him, and because the powers of knowledge and of action are inherent in him. The universality of this is the subtle organism (of the soul,) because it is subtler than the gross organism. The threefold case, having the desire of awaking, is dream, and therefore called the place of destruction of the gross organism.—*Taijasa* the soul, in which the speciality of this threefold organism is inherent, is called the *manifesting mind*. The speciality of this is the subtle organism from its being subtler than the gross organism. This threefold case having the desire of awaking, is dream, and therefore called the place of destruction of the gross organism. Both *Shútrāta* and *Taijasa* perceive in that state the subtle objects by the subtle powers of the mind.

“*Taijasa*, the subtle possessor,” says the *Sruti*.

In that state there is no difference between *Shútrāta* and *Taijasa*, in which the universality and speciality are inherent, as there is none between the sky which covers the forest and the trees, or the sky which is reflected by the sea and many waters. Thus is the production of the subtle organism.

The gross elements are composed of the subtle ones according to the combination of five. The combination of five is to divide each of the five elements into two parts, then equally to divide each of the five former of the ten parts into four parts, to separate these four

Production of the gross elements, combination of five.

पञ्चीकृतं

of the one half from their own parts, and to join them with the parts of the other elements. The combination of five is proved beyond doubt by the *Sruti*, in which a combination of three of the same kind occurs. Though the elements are equalized with each other (containing a fourth part of their former halves) yet it is proper to call them by their own name, according to the greater proportion of one element (in that combination.)

In that state sound is manifested in the ether, sound and feeling in the wind, sound, feeling and colour in the fire, these three with taste in the water, and these four with smell in the earth.

From these five elements, combined in the said manner, were produced the different Upper Lókas* (worlds) viz., Bhur-lóka, Bhuvar-lóka, Swar-lóka, Mahar-lóka, Janar-lóka, Tapar-lóka and Satya-lóka, which are placed above the others, then the Nether-lokas,† viz., Atala, Bitāla, Sutala, Rasatāla, Talātāla, Mahātāla and Patāla, which are placed one beneath the other, farther Bramha's mundane egg, the gross organisms in their fourfold division, contained in that egg, and food, water and other substances.

Bodies (organic) are either produced from the womb, or from eggs, or from damp, or from germs. Those produced from the womb are born alive, as men, animals, &c.; from eggs come forth from an egg, as birds, serpents, &c.; produced from the damp are worms, insects, &c.; which are born from hot moisture, produced from germs are those which emerge from the earth, as creepers, trees, &c.

Here also is the gross organism in its fourfold division, by being the object of one or many minds either a totality, like the forest or the ocean, or separated into a plurality of bodies, like the trees and waters. The soul in which this totality is inherent, is called Vaishvánara, Viráj, on account of its knowing itself as the totality of men, and of its governing the universe. This gross body is here

* **लोकः** (Lóka) world, division of the universe in general, three divisions are enumerated, or heaven, hell and earth; another classification enumerates seven, exclusive of the infernal regions, or *Bhurlóka*, the earth, *Bhuvar-lóka*, the space between the earth and the sun, the region of the *Munis*, *Siddhis*, &c. *Sver-lóka* the heaven of Indra, between the sun and the polar-star. *Mahar-lóka*, the usual abode of *Bhrigu* and other saints, who are supposed to be co-existent with *Brahma*. During the conflagration of the lower worlds, the saints ascend to the next, or *Jana-lóka*, which is described as the abode of *Bramha's* sons, *Sanaca*, *Sananda*, *Sanatana* and *Sanatacumara*; above this is the fifth world, or the *Tapar-lóka*, where the deities, called *Vairagis* reside; the seventh world, *Satya-lóka*, or *Bramha-lóka* is the abode of *Bramha*, and translation to this world exempts beings from farther birth; the three-first world are destroyed at the end of each calpa or day of *Bramha*; the three last at the end of his life, or 100 of his years; the fourth *Lóca* is equally permanent, but it is uninhabitable from heat at the time the three first are burning. *Wils. Sansc. Dict.*

† Internal regions, in which various evil beings have their abodes.

the universal gross body of the soul, and because it is subject to change from nutriment, it is called the nutritious case of the soul ; it is called awake, because it is the place in which the gross organisms are enjoyed.

The soul in which the speciality of this gross organism in its four-fold division is inherent, is called *Bishwa*, (which enters into all) because, not leaving the subtler body it enters into the gross body. The gross body of the soul as speciality, because it is subject to change from nutriment, is called the nutritious case of the soul, it is called awake, because it is the place in which the gross things are enjoyed. In that state perceive both Biswa and Baishánara (the universal soul and the single soul, in which the gross organism is inherent) by their five intellectual organs, which are respectively ruled by the quarters of the world, the winds, the sun, Varuna (god of waters) and the Aswis (Gemini) sound, feeling, colour, taste and smell, by their organs of action, which are respectively ruled by the fire, Indra, Upendra, (form of Vishnu) Jama, (death) Prajapati, (Bramha as creator) they possess the power of speech, taking, going, evacuating, generating, and by the internal four organs, understanding, reason, consciousness and thinking, which are respectively ruled by Chandra (moon) Chaturmukha, (the fourfaced, a form of Bramha) Chankara, (a form of Shiva) Achyuta, (Srikrishna) they possess the power of asserting, deciding, consciousness and thinking, that is to say, they possess all the objects of the gross organism.

“ In the state of awaking knows the soul the external objects,” says the Sruti.

In that state there is also no difference between Bishwa and Baishánara, in whom the universality and speciality of the gross organism are inherent, as there is none between the sky, which is covered by the forest, and the trees, or between the sky, which is reflected by the sea, and by many waters. Thus is the production of the universe of the gross organism from the five elements, in the combination of five. The universality of the expanses of the gross, subtle and causal bodies is one great expanse, as the universality of inner forests becomes one great forest, or as the universality of inner oceans one great ocean. The soul, in which this is inherent, from Bishva and Baishanara to the Supreme Ruler is *one soul*, like

the sky, covered by inner forests, or like the sky, reflected by the inner oceans. The uninherent soul, when like a burning iron-ball, not separated from both, the great expanse and the soul, in which the former is inherent, is the literal meaning of the great sentence: all this is in truth Bramha; when separated, it is the real meaning. Thus is the improper transferring of an unreal thing upon the real thing generally explained.

The various modes of placing this and this, or that and that, upon the all-pervading soul, will now be specified.

Various modes of transferring.

A very common man, because the Sruti says, "The soul is born as a son," because he loves his son as himself, and because, when his son is in good or bad circumstances, he thinks himself so, asserts, that *the son is the soul*. A Chārvāka*, because the Sruti says, "This soul is a body of blood and flesh, because he leaves his own son in a burning house to save himself, and because he thinks, I am stout, I am thin, asserts, that the gross body is the soul." Another Chārvāka, because the Sruti says, "The sentient souls, repairing to the Lord of creation, addressed him thus," because there is a want of bodily motion, when there is a want of the intellectual organs, and because he thinks, I am blind, I am deaf, asserts, that the intellectual organs are the soul. Another Chārvāka, because the Sruti says, "The other internal soul is vital," because there is a want of action of the intellectual senses, when the vital airs are wanting, and because he thinks, I am hungry, I am thirsty, asserts, that the vital airs are the soul. Another Chārvāka, because the Sruti says, "The other internal soul is reason," because there is a want of the action of the vital airs, &c., when the mind sleeps, and because he thinks, I assent, I doubt, asserts, that the reason is the soul. A Bauddha,† because

* Colebrooke, R. A. Trans. vol. i. p. 597, says of the sect of the Chārvākas, that they restrict to perception only the means of proof and sources of knowledge, that besides the four elements, earth, water, fire and wind, they acknowledge no other principles, that the soul is not different from the body.

† Col. Miscell. Essays, vol. i. p. 396. The Bauddhas or Saugatas are followers of Buddha or Sugata. No less than four sects have arisen among the followers of Buddha. Some maintain, that all is void. To those the designation of Mādhyamika is asserted by several of the commentators of the Védānta. Other disciples of Buddha...maintain the existence of conscious sense alone. These are called

the Sruti says, "Another internal soul is knowledge," because there is no action of the organs, when there is no ruler (first mover,) and because he thinks, I am enjoying, asserts, that the understanding is the soul. Prābhākaras and logicians, because the Sruti says, "another internal soul is pleasure, because it is evident, that ignorance destroys the understanding, and because they think, we are ignorant, we know, assert, that ignorance is the soul.

The followers of Bhatta, because the Sruti says, "The soul is knowledge as pleasure," because in deep sleep manifestation and also non-manifestation take place, and because they think, we do not know ourselves, assert, that the soul, in which unconsciousness is inherent, is the soul.

Another Baudha, because the Sruti says, "This (universe) was before (the creation) nothing," because in deep sleep there remains nothing, and because he who awakes, naturally thinks, I did not exist in deep sleep, asserts, that the soul is nothing.

In all those assertions, commencing with the son and terminating with the nothing, (void) the soul is asserted to be what really is not the soul. As the apparent arguments from the Sruti, inference and observation, which commence from the common assertion of the son, clearly show, that one argument from the Sruti, inference and observation is refuted by arguments of the same kind, it is evident, that the soul is not the son, &c. That the soul is not mind, not a first mover, that it is mere knowledge, mere existence, follows from the contradiction of a much more powerful Sruti, it follows from the reason, that all those inanimate principles from the son up to the void, by having their existence only through the manifestation of the soul, are transient like all material beings, and also, that there is much greater authority in the thought of the wise: I am Brahṃa. It is therefore evident from the contradiction of these arguments from the Sruti, inference and observation, that none of these principles is the soul. Therefore the eternal, pure, omniscient, free, true, self-existent (or

Jógachāras. Others, again, affirm the actual existence of external objects no less than internal sensations. Some of them recognise the immediate perception of interior objects. Others contend for a mediate apprehension of them. Hence two branches of the sect of Buddha, one denominated Sautrāntica, the other Vaibhāshica.

whose nature is true) all pervading Cháitanya, which manifests all those principles, is the supreme soul, this is the opinion of those that know the Védánta. Thus the improper transferring.

Abstraction (अपवादः) is called the action, by which the real thing is acknowledged as the only real thing, after the expanse of the unreal things which commence from the unconsciousness, has been removed from it, as a rope is acknowledged to be a mere rope, when the (notion of the) serpent has been removed from it. In this manner has the place of fruition, viz., the gross body in its fourfold division, the substances which are fit to be enjoyed, as drinking, food, &c., in this manner the place of their support, the earth and the other fourteen worlds, in this manner Bramhá's egg (the universe) all this has its existence alone in the gross elements in the combination of five, which are the cause of them. The elements in the combination of five together with the sound and other objects of the gross bodies, all this has its existence alone in the uncombined elements, which are the cause of them. The uncombined five elements together with the three qualities (truth, action and darkness) all this has its existence alone in the soul, in which unconsciousness as its cause, is inherent, further, this unconsciousness and the soul, in which it is inherent and which has the predicates of supreme lord, &c., is merely the fourth Bramha, the uninherent soul, which is the place of support for them.

The sentence, that* art thou,† becomes by means of both, the improper transferring and abstraction explained in its full meaning; 1, the universality of ignorance and what is connected with it; 2, the soul in which it is inherent and which has the predicates of omniscience, &c.; and 3, the uninherent soul, these three are, like a burning iron-ball, when perceived as one, the literal meaning of the term *that*; the uninherent soul, being the place of support, in which the properties of that (universality) are inherent, is the designable (real) meaning of the term, *that*. These three—1, the speciality of ignorance; 2, the soul, in which it inheres; and which has the quality of ignorance and other imperfections, and 3, the soul in which this is not inherent, these three like a burning iron-ball, when perceived as

* The universal soul.

† Any individual intelligence.

one, are the literal meaning of the term, thou ; the all-pervading blessed, fourth, supreme soul, being the place of support, in which the properties of that (speciality) are inherent, is the designable (real) meaning of the term, *thou*.

III. Connexion.—The meaning of the great sentence will now be explained. The sentence : *that art thou*, explains the true signification of the infinite Bramha by the three categories of relation. The three categories are : 1, the relation of what is identical in these two terms ; 2, the relation of what is distinguishable and distinguishing (subject and predicate) in the meaning of them ; 3, the relation of what is designable and what is designing in the meaning of those terms, viz. the universal and the single soul ; for it is said, “ that the identification, the fixing of what is distinguishable and distinguishing, and the relation between what is designable and designing explain the meaning of the terms of the single and universal soul.”

1. *The category of identification* ; as in the sentence, that is this Dévadatta, the term *that*, which refers to Dévadatta, as being in a past time, and the term *this*, which refers to Dévadatta, as being in the present time, (both terms) design the connexion in one and the same place ; thus also in the great sentence, “ that art thou,” both terms, viz. the term of *that*, which means the soul, as having the attributes of invisibility, &c. and the term of *thou*, which means the soul, as having the attributes of visibility, &c., design the connexion in one and the same soul.

2. *The category of what is distinguishable and what is distinguishing* (subject and predicate) ; as in the former sentence, (that is this Dévadatta) the meaning of the term *that*, which refers to Dévadatta, as being in a past time, and the term *this*, which refers to Dévadatta, as being in the present time, both come into the relation of what is distinguishable and distinguishing by the annihilation of their mutual differences ; thus also in the great sentence both terms, viz. the term *that*, which means the soul, as having the attributes of invisibility, &c., and the term *thou*, which means the soul, as having the attributes of visibility, &c. come into the relation of what is distinguishable and distinguishing by annihilation of their mutual differences.

3. *The category of what is designable and what is designing*, as in the same sentence, (that is this Dévadatta) the relation of the design-

able and the designing refers simply to Dēvadatta, in which there is no contradiction, after the contradictory terms of *that* and *this* or their corresponding meanings, being in the past and in the present time, have been dispensed with ; thus also in the great sentence the relation of the designable and the designing, refers simply to the soul, in which there is no contradiction, after the contradictory terms *that* and *thou*, or their corresponding meanings, viz. having the attributes of invisibility and visibility, have been dispensed with.

This category is called the partial designation. In the great sentence the meaning is not consistent,* as it is in the literal meaning of the sentence—the lotus is blue. In this case, as in the term *blue*, the quality of blue, and in the term *lotus*, the thing lotus, exclude other qualities and things, as for instance white, and cloth ; and as the unity of the mutual connexion of predicate and subject, or the unity of the one, determined by the other, are in correspondence with each other, because there is no contradiction from another argument, (in this case) the meaning of the sentence is consistent ; but if you think that, in the great sentence, by excluding the mutual differences of the term *that*, which means the invisible Chāitanya (soul,) and of the term *thou*, which means the visible Chāitanya, the meaning of the sentence does agree, viz. the connexion between predicate and subject, or of the unity of the one, determined by the other, we must maintain, that the meaning of the sentence is not consistent, because it involves the contradiction of the invisibility, &c. Nor is here an omitting designation (ellipsis,) as in the sentence—on the Ganga lives the herdsman, consistent. As there is in this case a perfect contradiction in the meaning of the sentence, which expresses a connexion between the support, and what is to be supported, viz. the Ganga and the herdsman, the ellipsis is called for, because there is a propriety in the designation of the bank of the Ganga, by entirely dispensing with the meaning of the sentence. In the great sentence, however, as there is no contradiction in one part alone of the meaning which shows the unity of the invisible and visible Chāitanya, the ellipsis cannot take place, because another ellipsis would be improper without also dispensing with the other

* The author, after having discussed the three categories of relation, refutes three other forms of relation, which at the first glance may appear to express the meaning of the great sentence.

part. If you say, as the term *Ganga*, by entirely rejecting its own meaning, points to the term *bank*; so also the terms *that* and *thou* by entirely rejecting their literal meaning, point to the terms, *thou* and *that*; why then should the ellipsis be inadmissible: then we must say, you are not right, because in the former sentence, if you did not mention the term of *bank*, its meaning was not known, which therefore required such an ellipsis; but in the latter sentence, by mentioning the terms *that* and *thou*, their meanings are fully known, and consequently there is here no necessity of knowing the meaning of one word by another through the mentioned ellipsis.

Nor is here the case of the not omitting designation admissible,* as in the sentence—*red runs*. The sentence, which speaks of the moving of a quality, is contradictory; but here by not omitting it in the ellipsis of a horse, which is the place of this or other qualities, the contradiction is removed, and the not omitting designation is proper; but in the great sentence, on account of the contradiction in the meaning, which points out the unity of the invisible and visible *Chaitanya*, if you, not dispensing with the invisibility and visibility, refer through the said ellipsis to any other terms, the contradiction is not removed, and therefore this ellipsis cannot take place. But if you say, that the terms *that* and *thou*, by rejecting the contradictory part of their own meanings, point to the terms *that* and *thou*, as united with the other part, and if you continue, why then do you not grant a partial ellipsis by another means? We must say, that this is not proper, because it is impossible to grant an ellipsis for both, viz., for a part of its own meaning and for another term by a single term; and also because the meaning of the terms being known, there is no necessity to know them by an ellipsis.

As therefore the sentence, this is that *Dévadatta*, or its meaning on account of the contradiction in a part of its meaning, which refers to *Dévadatta*, as being in the present and in the past time, by omitting the part which refers to the contradictory terms, being in the present and in the past time, the not contradictory part only, viz. *Dévadatta*, remains; so in the great sentence, *that art thou*, or the meaning of it, on account of the contradiction in a part of its meaning, which

* This term means, that a word retains its literal meaning, while at the same time it points to a term, which is not included in it.

refers to the invisible and visible Chaitanya, by omitting the part which refers to the contradictory terms, having the attributes of invisibility and visibility, refers to the not contradictory part only, viz. Chāitanya (soul.)

The meaning of the great sentence, *I am Bramha*, which was received by internal perception, will now be given.

When the teacher has thus, by means of the improper transferring and of the true abstraction, purified the two terms, *that* and *thou*, and the meaning of the infinite one has been explained by the great sentence, then is produced in the mind of the qualified person the act of the understanding, formed by the form of the infinite Bramha, viz., I am the eternal, pure, omniscient, free, true, self-existent, ever blessed, infinite Bramha, without duality. This act (of the understanding,) together with the (adequate) likeness of the omniscient being, by making the all-pervading, undivided, unknown, supreme Bramha its object, destroys the ignorance with regard to him.

Then as cloth is burned by the burning of the thread, which is the cause of it; so by the destruction of the ignorance, which is the cause of the whole creation, the act of the understanding, formed by the form of the infinite substance, is also destroyed, as included in that creation. As the shine of a lamp is absorbed by the overpowering rays of the sun; so the soul, which is reflected by that act of the understanding, and absorbed by the self-manifesting, all pervading, undivided, supreme Bramha, which it (the understanding) is unable to manifest, (the soul) becomes, since the act of the understanding, which is a part of his qualities, is destroyed, the all-pervading, undivided Bramha, as the face only remains, when the looking-glass, in which it was reflected, has been removed. If this is true, the contradictory statement of the two passages of the Sruti, viz., "by the mind it must be comprehended," and "what is not perceived by the mind, is reconciled," because by granting, that the act of the understanding makes Bramha its object, the effect (the manifestation) must be at the same time prohibited. It is also said, to make (Bramha) object of manifestation, is prohibited by the authors of the Shastras. For the destruction of the ignorance respecting Bramha, that act of the understanding is required, and it is not proper that he who manifests himself, is manifested by another.

The particulars of the act of the understanding, formed by the form of the inanimate substances, are as follow. For instance, in the perception of this thing, the act of the understanding, formed by the form of this thing, in making the (this) unknown thing its object, manifests even the inanimate matter, which is this thing, by the manifestation of the knowledge, which that act of the understanding has acquired, after the ignorance with regard to that thing has been removed, as the shine of a lamp in making any thing, concealed by darkness, its object, manifests by its own power (shine) the thing, after the darkness, in which it was concealed, has been removed.

IV. The four means.—The diligent application of the four acts, viz. hearing, attention, of contemplation and meditation, being required, until the perception of the soul, which has no other likeness but with itself, is obtained, they must be here described.

1.—*Hearing* means the fixing of the opinion of the Védāntas with regard to the being without duality, by the six modes of determination, which are, the commencement and the end, the practice, the exclusion of other arguments, the final end, the proper speaking, and the demonstration.

a. The commencement and the end is the fixing of any subject, to be explained in a chapter (of the Védānta) in its commencement and end; for instance, in the sixth chapter of the Chandógya Upanishad, the definition of the being without duality, which is to be explained in that chapter, is in the commencement, one even without duality, and in the end, that Bramha, the life of the whole universe.

b. Practice is repeatedly to mention a subject in a chapter, in which it is to be explained; as for instance, in the middle of that chapter (Chandógya) the nine times mentioning of the being without duality by the great sentence, *that art thou*.

c. The exclusion of other arguments is not to demonstrate a subject, to be explained in a chapter, by other proofs, as in that chapter the being without duality is not demonstrated by another proof.

d. Final end is the fruit from the knowledge of Bramha, to be explained in a chapter, or from the practice of that knowledge, as it is mentioned in that chapter, "that the man who has a teacher, knows that he belongs to him, until he is liberated; then he will

be saved." Thus the principal fruit from the knowledge of the infinite being is to gain that end.

e. The proper speaking is the praising of any subject in a chapter, in which it is to be explained ; for instance, it is a praise of the being without duality in that chapter. " O thou (disciple) you asked for such advice, by which that which is never heard, is heard ; that which is never thought, is thought ; and that which is never known, is known.

f. Demonstration is the proper mode of deduction for the attainment of complete understanding of the subject, to be explained in a chapter ; as for instance, in that chapter, " O thou handsome youth, as all things, made of earth, are known by one clod of earth, the difference consists in words only ; the real thing is earth, so the demonstration in that chapter is the proper mode of deduction in the attainment of the complete understanding of the being without duality, that there is no difference but in words."

2.—*Attention* is the constant attending to the being without duality, by those demonstrations, which refer to it in the Védānta.

3.—*Contemplation* is the remaining of the same state of the understanding, formed by the form of the being without duality, with regard to that being, which is not believed to exist in the transient form of a body.

4.—*Meditation* is twofold ; the one in the form of difference, the other without it. Meditation, which has the form of difference, is to place upon the being without duality the act of the mind, formed by the form of it (that being) without removing the difference between him who knows, the object of knowledge, and knowledge itself. As in the perception of an earthen elephant, earth only is actually perceived ; so the being without duality is perceived even in the perception of duality. Thus it is said by philosophers, who maintain, the being, which is like the eye, which is (the support of all) like the ether, which is supreme, which is at once manifest, which is not produced, which is one (without difference in itself and from others) imperishable, in which all differences are annihilated, which is omnipresent and without duality, even this being am I, who is for ever liberated. I am perfect in knowledge, pure, unchangeable ; I am not fettered, I do not require salvation.

The meditation without difference is to place upon the being without duality the same act of the understanding, formed by the form of it (that being) after having removed the differences between him who knows, the object of knowledge, and knowledge itself. As water alone appears by the disappearance of salt, which is formed by the form of water; so appears the being without duality alone by the disappearance of the act of the mind, formed by the form of that being. Still it must not be thought, that there is no distinction between this state and sound sleep: for though in either the same absence of the act of the understanding does occur, yet, from the existence and not existence of that act in either state, the distinction between them is evident. This meditation includes: refraining, religious refraining, sitting in a peculiar posture, suppression of breath, coercion, internal fixing and meditation.

Refraining includes the following acts: refraining from injury, regard for truth, abstaining from stealing, obedience to the spiritual teacher, and not accepting (gifts.)

Religious refraining includes purification, contentment, devotion, reading (of the Védas) and meditation on the Supreme Ruler.

Sitting in a peculiar posture are the different modes of placing the members of the body in a prescribed form, as in the form of a lotus, &c.

Suppression of the breath is the peculiar mode of expiration and inspiration, and of keeping the breath.

Coercion is the refraining of the senses from their objects.

Internal fixing is to fix without intermission the acts of the internal senses upon that being.

Meditation, is here the first one, which has the difference in itself.

There are four obstacles to the perfect meditation without difference: viz. listlessness, absence of mind, passion, and propensity to pleasure.

Listlessness is the sleep of the mind, (caused) by not attending to the being without duality.

Absence of mind is attention to other things by not attending to the being without duality.

Passion is inadvertence to the being without duality, not from listlessness, or absence of mind, but from the act of the understanding, being fettered by the desire of love, or other passions.

Propensity to pleasure is, to enjoy by the act of the mind, no being directed to the being without duality, the pleasure, produced by the meditation, which has its difference in itself, or the enjoyment of pleasure, produced by that meditation at its commencement. When the understanding, free from those four obstacles and immovable like a lamp, protected from the wind, thus becomes the infinite Chaitānya alone, then the meditation is called that without difference. It is said, he will awaken the understanding, sunk in listlessness; he will concentrate it, when lost in absence of mind; he will enlighten it, when blinded by passion; he will not move it, when steadied by austerities; he will not let it taste pleasure; by the consideration (of universal things) it will be without fondness. As a lamp, protected from the wind, &c. &c.

Definition of the living free. The living free is the Bramhanishta (devoted to Bramha) who, after the infinite, self-like Bramha is known, when the ignorance with regard to him is removed by the knowledge of the self-like, infinite, pure Bramha, is free from all worldly fetters, by the destruction of the ignorance and its creation, of the unrewarded works (those works which have not borne their fruit previously to the true knowledge) of doubt, (viz. whether there is a soul different from the body or not) and of other misapprehensions. "When he, the universal soul, has been perceived, then all the conscious acts of the understanding are extinguished, then all doubts are removed, and also his works are annihilated," says the Sruti.

Though he in the time of awaking (the Bramhanishta) by his body, which is like a vessel of flesh, blood, &c., by his senses, which are like vessels of blindness, bluntless and unfitness, and by his mind, which is the vessel for the sensations of hunger, thirst, grief and error, performs the works which are worked by the impulses of his former desires, and enjoys the fruits of his undertakings, which (the fruits) are no obstacles to the true knowledge; still he does not actually perform or enjoy them, since he has destroyed the whole creation of ignorance, as a person, who knows a thing, which he perceives to be an illusion of his senses, does not actually believe in its reality, though he may perceive it. "As one seeing does not see, or hearing does not hear," says the Sruti. It is also said, who in a waking state is like a person fast asleep, who does not perceive, though perceiving, duality, because he is

above duality, who, though acting, does not act, he knows the soul none else; this is certain. As previously to the obtainment of this knowledge he followed the sensations of hunger and other appetites, so he (now) follows (only) the impulses to good works, or there is the same indifference to good and evil actions. It is said, "If he, who knows the reality of the being without duality, can act according to his desire, what difference is then between a dog and him who knows the truth, as regards the taking of impure food. He knows the soul, who has purified the knowledge of Bramha (from ignorance) not another, must be the answer. Humility of mind, the cause of true knowledge, benevolence and other virtues will adorn him like ornaments (in that state.) It is said, he who has gained perfect knowledge of the soul, possesses benevolence and other virtues, without effort on his part; but not he (possesses them without effort) who is striving for the means of salvation. What else can I say? He, who for the maintenance of his body only suffers the happiness and misery, resulting from his works, which are done to accomplish his own desires and aversions, as well as those of others, and brings to light the impulses of his mind, will on the approach of death unite his life with the all-pervading, ever blessed, supreme Bramha; and having thus destroyed the perception of ignorance and of its creation, he will exist as the supreme Bramha, who is perfect salvation, the fountain of all bliss, and free from the signs of every difference. His life is not taken to other places, but to him (Bramha) it is flowing. Free, he is made free; thus says the Sruti.

Note of the Course of Study pursued by Students in the Sanskrit College, Calcutta. By W. SETON KARR, Esq., B. C. S.

The course of study pursued by the students of the Sanskrit College is as follows: they begin by studying *Vyakaranam*, or grammar, for the first three years. The grammar mostly used is one called the *Mugda Bodha*, written in Sanskrit, as those written in Bengali are despised by the Natives. It is a peculiarly native idea, that until a thorough acquaintance with the rules of grammar, as seen theoretically, is obtained, nothing can be done towards acquiring the language by reading other books; no attempt is therefore made to combine the learning of the rules of grammar with the reading of the *Hitopadesa* or other books of an easy style. When, however, they have acquired such a thorough knowledge of grammar as to be able to repeat whole pages of it by heart, they plunge at once into some of the hardest books of the language; the next two years succeeding the three spent on grammar are devoted to reading the following works: the *Bhatti Kavya*, or poem of Bhatti, a work made principally to aid the acquisition of grammar, every line being an illustration of some particular rule; the *Raghu Vansa*, the *Kumara Sambhava*, *Naishadha*, *Sisupalabadha*, *Sacotala*, *Veai Sanghara*, *Murari*, *Bharovi*, *Prasanna Raghava*, *Ultara Rama Charitra*, *Raghava Pandavi*, *Vasavadatta*. Several of the above works are known by the name of "Mahakavya, or great poems," a title applied to only six works; those of the above which lay claim to it are the *Raghu-vansa*, *Kumara Sambhava*, *Sisupalabadha*, and *Naishadha*. The next year is devoted to *Alankara*, or rhetoric during which the following works are read: *Sahitva Darpanam*, *Kavyo Prakasha*, and *Chando Mangari*,—all these they *learn off by heart*.

The next year is devoted to the *Vedantas*, or works of later writers, illustrating the scope and objects of several passages in the *Upanishads* of the *Vedas*, relating to an abstract and speculative monotheism. The works read are the *Vedanta Sara*, *Panchdasti*, and *Sharirika-shutra*.

The next year is devoted to *Nyaya*, or logic. Works read, *Bhasha-paricheda* (the division of language) and the *Gautama-sutra*.

The next year is devoted to mathematics. Books, the *Lilavati* and *Bijganita*.

The next three years are devoted to *Smṛiti*, or law. The books read are Manu, the Mitakshara, Daibhaga, Dattika Mimansa, Dattaka Chandrika, Udraha-tattiva, Shuddhi-tattiva, Dayakrama, Sangraha, and Dhaiva-tattiva. *The whole of these last*, with the exception of Manu. are committed to memory; besides this they are in the habit of learning by heart the greater part of a dictionary, called the Amara-kosha (*immortal treasure*,) which contains the various synonyms of nouns current in the Sanskrit language, which, with regard to remarkable objects, as the sun, the ocean, Brahma, Vishnu, Shiva, a lotus, a serpent, &c. &c. are unusually numerous.

No student can be received after fourteen years of age in the Sanskrit College, and the whole time of study spent there is twelve years!

There are also a number of verses or *slokas* handed down traditionally from father to son, generally expressive of some pithy sentiment. It is pretty certain that they are not to be *found in any book*; of these, five hundred were known by one individual. Many of the Pandits during the whole of the above course of study have never read the Hetopadesa, one of the most curious books in the language, as being the only one written in prose; all the immense ocean of Sanskrit literature is in verse—even an unprinted novel, containing the history of an heavenly Apsara, who loved a prince named Chandrapiri, is in verse: the love of the Apsara reminds us of that of Aurora to Tithonus, or Venus to Anchises. The ponderous tomes of the Mahabharata are often *totally neglected* by the Pandits, although that poem is called the "*fifth Veda*," from its sacred character and great antiquity. This poem and that of the Ramayana, which Sir William Jones termed the two epic poems of the Hindus, are thus quite cast out of the circle of the Sanskrit College reading.

As Sanskrit scholars in Europe might feel interest in the above abstract, I publish it as communicated by a member of our Society, W. Seton Karr, Esq. C. S., who originally suggested to me the obtaining a statement of the sort for the Journal.



Memorandum on the Ancient bed of the River Soane and Site of Palibothra. By E. C. RAVENSHAW, Esq., B. C. S., with a Coloured Map.

One of the chief difficulties in identifying Patna as the site of Patalipootra, the capital of Chundragupta, has been the distance which at present exists between the river Soane and the city of Patna. Any satisfactory evidence, therefore, which can be brought to establish the fact that the confluence of the Soane and Ganges in former days took place in the vicinity of Patna, is of importance both in a geographical and historical point of view. Major Rennell, in his "Memoir of a map of Hindoostan," (page 50,) observes, that "Late enquiries made on the spot (about 1787 A. D.) have brought out this interesting discovery, that a very large city which anciently stood on, or very near, the site of Patna, was named Patelpoother (or Pataliputra according to Sir W. Jones,) and that the river Soane, whose confluence with the Ganges is now at Moneah (Muneer), 22* miles above Patna, once joined it under the walls of Patelpoother. This name agrees so well with Palibothra, and the intelligence altogether furnishes such positive kind of proof, that my former conjecture respecting Conoge must fall to the ground." In page 53, he adds, that "The ancient bed of the Soane is yet traceable on the south of Patna, and seems to have led into the Ganges near Futwah."

On accidentally meeting with the above passages in Major Rennell's work, at the time that the Professional Survey of the Patna district was going forward, I requested Lieutenant Maxwell of the Bengal Artillery (the officer in charge of the survey) to endeavour, if possible, to trace out the course of the old bed of the Soane, with a view either to verify or disprove the correctness of Major Rennell's information. Lieutenant Maxwell entered into the enquiry with his usual zeal, and with no other hints than what are contained in the above quotations, was successful in clearly tracing the old bed from a point on the Soane, near Sydabad (about 18 miles above Muneer) viâ Bikrum, Nowbutpoor, Phoolwaree, Meethépoor to Bâkipoort†, where it appears to have

* It is now only 12 miles above the Golah, and 17 above the Western Gate of the old Fort of Patna.

† Called by European Residents, Bankipoor.

joined the Ganges about 200 yards west from the Golah, and nearly opposite the point where the Gunduck falls into the Ganges from the north. I forwarded the sketch map, prepared by Lieutenant Maxwell, to Mr. J. B. Elliott, late of the Civil service, the oldest European resident at Patna, who informed me in reply, that some years ago he had been led, by the perusal of the Drama called "*Mudra Rakshasha*," to make similar enquiries from the natives of the place. The following is a translation of the result of his enquiries, which corresponds very remarkably with the scientific survey: "Formerly the course of the Sone turned eastward from near Sydabad, whence it proceeded by Ghorhutta and Bikrum to Nowbutpoor, thence via Moorgheea Chuch Mooradpoor, Danapoor, Ghosunda, Koorjee, and Khugwul to Phoolwaree. From the latter town it flowed past Khwajapoor, Sheikhpoor, and Dhukunpoora to Meethapoor; whence in two streams (Jurrah) it fell into the Ganges near Bâkipoor at the Tukeea of Shah Rookun Phulwan. From Phoolwaree a small stream (Sotah) flowed to the eastward, and from opposite Meethapoor, proceeding in a south-easterly direction, it finally united with the Ganges near Futtooha, (Futwa). In the time of Mukhdoom Shah Shuruf Ooddeen Ahmud Yaheea Munéree, (from which a period of upwards of 470 years reckoning to the end of 1251 Hijiree has elapsed,) the main stream of the Sone, taking its course west of the town of Muneer, united with the Ganges near that place, and the eastern course with the Sota became dry."

Lieutenant Maxwell in his first survey was unable to find any trace of the river south of Patna, but the information contained in the above statement regarding the branching off of a Sota, or small stream, from Phoolwaree, enabled him to discover and to follow the bed of the stream to the south of the city by Khémee Chuck and Mirchee, and its exit into the Ganges through the arch of an old bridge, about $3\frac{1}{2}$ miles above Futwa.

The accompanying reduced map on a scale of four miles to the inch, prepared by Lieutenant Maxwell, will I hope be thought satisfactory as being the first ever published, which clearly defines the ancient course of the Soane. After receiving this map I met with the following passage in Buchanan (page 11, volume I, Mr. Martin's edition,) which was written about twenty-three years after Rennell's remark

above quoted. "The Sôn, according to the Bengal atlas, formerly joined the Ganges at Mănér, but a tongue of land has been formed projecting east from the Shahabad district, so that Mănér is now three miles at least above the junction of the two rivers. The Sôn receives no branch during its course in these districts, but sends off some old channels that in different places are called by its name. The chief of these separates from the river 11 or 12 miles above Mănér, runs straight east to the thanah of Vikram, and then bends north until it passes Noubutpoor. Immediately beyond this it sends to the right a branch*, which, running through the whole breadth of the division of Bâkipoor, joins the dry channel of the Ganges, and is called Mohauleya. The main channel of the Măr-Sôn†, soon after the separation of the Mohauleya, divides into two branches, which re-unite before they fall into the Ganges at Danapur‡. That to the west is called Deonar, that to the east Bhadaiya. It must, however, be observed that an old channel may be traced running from this Măr-Sôn, and parallel to the Ganges, a great part of the way to Bâkipur, near the western extremity of the Patna city, and this may have been the old channel of the Sôn; and Patna may, therefore, have been once at the junction of this river with the Ganges."

This account, though differing in some particulars from that of the survey, agrees generally as to the fact of the confluence of the two rivers having been at Bâkipoor near Patna; and this fact corroborated by so many separate investigations made at different times, by different individuals, may therefore be considered as fully established. The alteration in the course of the Soane is supposed to have taken place in the time of Shah Shuruf Oodeen Ahmud Ehya Muneeree, 781 Hijeree, corresponding with 1379 A. D. The following extract§, from the Memoirs of the Emperor Baber, proves that in the time of that monarch the Soane flowed by Muneer in 1529 A. D., and so far corroborates the tradition of its having changed its course about the end of the fourteenth century. The "Mudra Rakshasa" shows that the

* Buchanan seems here to have been misinformed, and to have alluded to the branch which separates at Phoolwaree, instead of at Noubutpoor.

† "Măr," means dead or dry Soane.

‡ Dinapoor.

§ Page 412, Erskine's Translation.

change had not taken place when that play was written in about the eleventh century. "As they informed me that the Sôn was near at hand, we rode to see it. In the course taken by the river Sôn below this there are a number of trees, which they say lie in Munēr. The tomb of Sheikh Yahéa, the father of Sheikh Shuruf Munēr, is there. As we had come so far, and come so near, I passed the Sôn*, and going two or three *kos* down the river surveyed Munēr. Having walked through its gardens, I perambulated the Mausoleum, and coming to the banks of the Sôn bathed in that river."

Having established the fact that the Soane, in some former age prior to 1529 A. D. united its waters with those of the Ganges in the vicinity of Patna, it is now to be considered how this fact supports the opinion that the capital of Chundragupta was situated at the junction. Sir W. Jones, Major Rennell, Wilson, and Wilford, concur that tradition assigns to this locality the ancient city of Pataliputra. Buchanan, (in page 26, Volume I. Mr. Martin's edition) has the following observation on this point: "I have found in this district (Patna) no traditions concerning Chundragupta, nor his descendants the Boliputras, although Palibothra, his capital, is by Major Rennell supposed to be the same with Pataliputra, or Patna. This city indeed is allowed by the pundits to be called Pataliputra, but Pataliputra has no great resemblance to Palibothra, nor can Patali be rationally considered as a word of the same origin as Pali, said to be an ancient name of this country and of its people and language."

The following extract†, (freely translated) from the Brihud Kutha (or Brihut Kutha,) a work supposed to have been written by Barach (Vararuchi) pundit in the time of Vikrumaditya, king of Oojeen, about 57 B. C. may not be uninteresting, as conveying a popular tradition through the medium of a fiction, which however it must be owned is more suited to the Arabian Nights than to the gravity of history.

"In Kashomunee, a brahmin named Bhoom Deo, had two sons, Kooshun and Bukshun, who married Soomut and Purmut, the two daughters of Surub Siah Mooni. Soomut becoming pregnant, the two husbands reflected that, as they had scarcely means of subsistence

* He probably crossed near the present Ghat or Ferry at Koilwar.

† N. B. I believe this is not literally an extract, but a Potee, or tale, founded on it by one Shunkur Dutt, and called "Patalipootur Pokyan."

sufficient for four persons, they should be reduced to starvation on the appearance of a fifth. They accordingly agreed to set off secretly in the night in search of better fortunes, and leave their wives to take care of themselves. The next morning the wives found that their husbands had deserted them, and wandered about the forest in search of them. It so happened, that Mahadeo and Parbuttee were making an excursion through the air, and the goddess seeing the distress of the two women at the loss of their husbands, entreated Mahadeo to comfort and relieve them. Mahadeo thereupon called to them, and told Soomut that the child, which would shortly be born to her, would prove to be a source of wealth instead of poverty; that whenever he awoke from his sleep 1000 deenars would be found in his sleeve. The celestial visitants then disappeared, and returned to their home at Kylas. Soon after the birth of the child, which was a boy, the anxious mother Soomut discovered, to her amazement, that whenever the boy awoke from his sleep 1000 deenars really appeared shining from under his elbows. She and her sister Purmut, therefore, speedily became rich and went to Casi, where they purchased a large house, and became celebrated all over the country for their munificence and charity. The boy, being called Pootur (or son) by his parents, was afterwards styled Raja Pootur by the people of Casi, on account of his wealth and magnificence. In the mean time Kooshun and Bukshun, the two husbands, who were residing in Karnath (Carnatic) hearing the fame of his charities, proceeded to Casi, and applied to him as mendicants for food and alms. The two ladies recognising their lost husbands, but not being recognised by them owing to the sumptuousness of their dress, placed before them an excellent repast, and inquired, who they were and whence they came? Upon which Kooshun detailed their history as above. Soomut then observed, that there was a remarkable coincidence in their histories, and proceeded to narrate how they had been deserted by their husbands; how Mahadeo had appeared to them; and how her son had been endowed with the wonderful gift, which was the source of their wealth. The husbands then beginning to recognise the features of their wives, the latter threw themselves upon their necks and wept rejoicingly.

“All went on happily for some time, when the husbands grew jealous of the great attention which was paid to Raja Pootur, and con-

ceiving the story of the wealth-giving sleep to be a fiction, invented by their wives to conceal the real source of their wealth, they resolved to remove the youth from their path, thinking that by so doing they would obtain the entire control over the money, which was now squandered by him. On the pretence of its being necessary to the completion of his education and the benefit of his health that he should travel to Bindachul, they sent him, in spite of the remonstrances of their wives, under the charge of eight assassins with instructions to murder him on the road. Arriving in the depths of a gloomy forest, they prepared to execute their commission, but their hearts relenting, they informed Pootur of the real object of the journey, upon which he promised to reward them if they would allow him to sleep for an hour. The assassins retired, and at the end of an hour he brought them 1000 deenars, and gave them a ring from his little finger to show to his father as a proof of their having murdered him. The assassins returned to Casi, and showing the ring obtained their promised reward from Kooshun and Bukshun; but the two wives immediately on seeing the ring of Pootur conjectured his fate, and died on the spot. The wicked husbands were thus reduced again to the poverty from which they had been relieved.

"In the meantime the youth Pootur proceeded on his journey, and presently encountered two Rachases, named Bunkut and Sunkut, sons of Ghurbhaj. They told him, that their father had recently died and left them three wonderful things, which they found it difficult to divide between two, and they accordingly requested the advice of Pootur as to the best method of settling the dispute. The three things were—First, a pair of wooden shoes, which had the virtue of transporting the wearer immediately to any place he might wish to go to. Secondly, a purse, out of which the possessor could draw jewels and precious stones of any kind he desired, *ad libitum*. Thirdly, a staff, which on being erected in any chosen spot, a beautiful city would arise and endure for ever.

"Pootur, in answer to the application of the Rachases, proposed that they should decide the matter by a race, and that whoever first reached a distant point which he indicated, should retain possession of the three prizes. Agreeing to this, and depositing the stakes with Pootur, they set off at full speed. Immediately after their departure, Pootur heard a voice from Heaven, saying, 'Put on the wooden shoes, fix the purse

to your girdle, take the staff in your hand, and depart for Singhal-deep, (Ceylon).’ Pootur acted accordingly, and was out of sight before the Rachases returned from their race.

“On arriving at Singhal-deep, Pootur alighted on the edge of a tank where some women were washing clothes. On seeing so handsome a youth, they declared he must be Kamdeo (the God of Love) himself. On his informing them that his name was Pootur, they declared that August Mooni had prophesied, that Patlee the daughter of the king of Singhal-deep, would marry a person of the name of Pootur, and that he must be destined to fulfil the prophecy. In the meantime Patlee had been prepared for his arrival by Narud, a Mooni, then residing at the palace, who told her that the person destined for her husband would come from Casi.

“At night while Patlee was sleeping among her hand-maidens, Pootur, having put on the magic shoes, appeared at her bed-side, and awakening told her that he was Pootur, who had come from Casi to claim his destined bride. She said, she was willing to attend him; but must first get her jewels. He replied, that it was unnecessary, as he had only to put his hand in his purse, and he could bring out what jewels he pleased; in proof of which, he suited the action to the word, and continued drawing forth jewels without end, set in the most beautiful forms. Upon this the lady said she was quite at his disposal; so he took her by the hand, and thus addressed the Spirit of the Shoe: ‘Go to a spot which is north of Gya, east of the Sonebhudur (Soane river), west of the river Poonpoon, and which has the Ganges on the north.’ The Spirit of the Shoe accordingly ascended with them into the air, and transported them in the course of one hour to the present site of Patna, where Pootur planted his staff, and a beautiful city arose from the ground; which, in honor of his wife, he called Patleepoora, or Pataleepooturpoora.

“On the morning after the flight of Patlee, Narud informed the king of the event, and consoled him with the reflection that, as it had been predestined, there was no help for it. Narud subsequently paid the happy pair a visit at Patleepootra, and informed Pootur that as the two Rachases were dead, he need be under no apprehension as to their enquiry after the three Tûlismans which he had walked off with. He ordered him to keep them for 100 years, and then to go to Kylas (the

heaven of Mahadeo.) The Mooni departed after making five things:

"1st. A tank, called 'Sham Tulao,' in which whoever bathed was certain to have children.

"2nd. The Goor Tulao, by bathing in which the sick were cured.

"3rd. The Moonsurwur Tulao, by bathing in which a pregnant woman was sure to have a boy.

"4th. Ram Tulao, by bathing in which the poor become rich.

"5th. Two 'Sidh Peets,' the existence of which secures to a city perpetual duration and prosperity.

"Patlee and Pootur lived very happily their 100 years, and then went to Kylas. They left behind them two sons, Koosum and Puttun, and one daughter Putnee, from whom the modern name of the city is said to be derived."

Moonshee Kunhya Loll, who translated the above story into Oordoo from the Sanscrit, has attempted to identify the site of the four tanks. He maintains with considerable gravity, that the "Jeeuj Pokur" near the Durgah of Shah Arzan, is the Shám Tulao, and that women still bathe in it with the same object. An excavation in the mohulla of Mogulpooora, called "Nalbund ke Gurha," he holds to be the Goor Tulao. A place called Sheikh Muttee in Chuk Shekarpoor, he considers to be the remains of the Munsurwur Tulao; and the khye, or ditch of Begumpoor, he boldly affirms to be the Ram Tulao. He has not ventured, however, to discover any traces of the two "Sidh Peets." In the *Mudra Rakshasha*, a Sanscrit Play supposed to have been written about the eleventh century, the principal scenes of which are laid at Patalipootra, the capital of Chundragupta, a passage occurs, which evidently indicates the vicinity of the city to the river Soane. It will be found in Act IV. page 106, of H. H. Wilson's translation; Molaya Ketu, who is encamped at a distance of five days' march, thus issues his final orders for the advance of his army to besiege the city and dethrone Chundragupta:—

Then let us march. Our mighty Elephants
Shall drink the *Sone's* dark waves, and echo back
The roaring of its waters; spread through the groves
That shade its bordering fields intenser gloom;
And faster than the undermining torrent,
Hurl its high banks into the boiling stream;

Then rolling onwards, like a line of clouds,
That girts in rain and thunder Vindya's Peaks,
Environ with portentous storm the City,
And lay its proud Walls level with the ground.

That Patalipootra was not only in the neighbourhood of the Soane but also on the banks of the Ganges, is evident from the following soliloquy uttered by Chundragupta from the terrace of the Sûgânga Palace, at the festival of the autumnal full moon, that is, in the height of the rainy season, when the river is full and rapid in its course.

How beauteous are the skies at this soft season,
'Midst fleecy clouds, like scattered isles of sand
Upon whose breast the white Heron hovers, flows
In dark blue tides the many channelled stream;
And, like the pearly blossoms that unfold
Their petals to the night, the stars expand.
Below is Gunga by the Autumn led,
Fondly impatient, to her Ocean Lord,
Tossing her waves as with offended pride,
And pining fretful at the lengthened way.

In this Play the city of Chundragupta is called by the personages of the Drama by several different names, viz. Pushpapoor, Kasumapoor, "The City of Flowers," and Patalipootra. The first cannot be identified with the name of any place in the neighbourhood. With respect to the second, it may be remarked that in the tradition above given from the Brihdukutha, the name of one of the sons of Patlee was Koosûm, from which Koosumapoor may not unreasonably be supposed to have been derived. "Koosûm" in Sunscrit means "Flowers," and Koosumapoor, the City of Flowers. There are several names of similar import at present in the vicinity. Phoolwaree, the name of a town situated on the bank of the old bed of the Soane, about six miles from Patna, means "a place of flowers," and one of the muhullas, or divisions of the present city of Patna, is denominated "Goolzar Bagh," which in Persian has nearly the same meaning, and which may have been the Mohamedan translation for Koosumapoor. Indeed it is possible, (though I cannot say it is very probable) that the different names given to the city in the Sunscrit Play, may have been the names of

the different mohullas, or divisions of the old Hindoo city, which have been preserved under altered designations to the present day.

The Grom Deota, or tutelary divinity, is now Putnee Devee, to whom a small temple is dedicated, and to whom worship is still offered. Buchanan remarks, (p. 42, vol. I.) "The Goddess is said to have been placed in her present situation by Patali, daughter of Raja Sudarson, who bestowed the town now called Patna on his daughter, and she cherished the city like a mother, on which account it was called Patali-putra, or the son of Patali." According to the Brihdukutha, Putnee was the daughter of Patlee or Patali, but other traditions preserved in the Skunda Pooran, derive the name of Patna from a Sanscrit word meaning "a cloth," the goddess Parbuttee, the wife of Siva, having dropt her mantle on the spot during her flight to Kylas. In the "Pali Buddhistical annals" of Ceylon, translated by the Honorable G. Turnour, (p. 998 vol. VII. of Journal of Asiatic Society) Patali is mentioned as having been a mere village in the time of Buddho, (i. e. 541 B. C.) Buddho is said to have rested here on his way to Benares from Rajgeer, the capital of the king of Magadha, whose ministers were then employed in building a citadel for the purpose of checking the inroads of the warlike tribe of Wajjions. Buddho predicted, that the village of Patali was destined to become a great city, and that it was destined to suffer under the calamity of fire, of water, and of treachery.

It is worthy of remark, that in the memoir of the Emperor Baber no mention whatever is made of the city of Patna. The residence of the Put'han rulers of this part of the country seems to have been at the fort or town of Behar. Patna, therefore, must have ceased to be a place of importance prior to the sixteenth century. It appears from the Girnar* inscription, and also from the life of Shokya, extracted from Tibetan authorities (p. 317, vol. XX. Asiatic Researches) that Asoka, the grandson of Chundragupta, continued to reside at Patalipootra, but after the extinction of the Maurya dynasty, the capital of the Gangaridæ, and of the Prachya (Prasii), seems to have been transferred to Canoge, which under the Gupta dynasty became a city of great splendour and renown for many ages. This transfer of the seat

* Asiatic Journal, Vol. VII. page 268.

of Government was probably the cause of the desertion of Patalipootra, and of the oblivion of the name, except when awakened from time to time by the faint echo of tradition.

The site of the capital of Chundragupta having been fixed by the evidence above adduced, the next step of the argument is to prove the identity of Chundragupta with Sandracottas the king of the Prasii, whose capital was designated Palibothra by Megasthenes, the ambassador of Seleucus Nicator, the immediate successor of Alexander the Great in the kingdom of Bactria. Athenæus, Diodorus Siculus, Quintus Curtius, Plutarch, and other historians, mention Sandracottas as the contemporary of Alexander. Professor Wilson, in his Preface to the *Mudra Rakshasa*, observes that "Athenæus, as first noticed by Wilford (A. R. vol. V. page 262,) and subsequently by Schlegel, writes the name Sandrakoptus, and its other form, although more common, is very possibly a mere error of the transcriber." I may here remark, that the Greek alphabet having no letter which corresponds with "Ch," the Greek historians were obliged to substitute either the χ or the σ . Thus *Prachi* (which signifies, according to Wilson, the people of the East) was converted by the Greeks into *Prasii*, and the river Chumbul into *Sumbu*. Diodorus Siculus, on the other hand, changed Chandromas, a synonyme of Chandra* or Chundragupta, into "Xandramas." If on the principle above explained, the initial *S* be reconverted into "Ch," and the final "S," the usual Greek termination, be struck off, Sandrakoptas will become "Chandrakopta," which bears so striking a resemblance to Chandragupta as to leave little or no doubt of their identity. Professor Wilson has also pointed out the close resemblance between the birth, parentage and history of Sandracottas as described by the Grecian historians, and the account given of Chundragupta in the Vishnoo and Bhugwut Purânas. The similarity of names, supported by the coincidence in the history of the individuals, tends to establish the identity of persons, and no reasonable doubt can therefore be entertained that the Sandracottas of the Greeks was the Chundragupta of the Poorans.

This point conceded, (and it having been shown that Patalipootra was the capital of Chundragupta,) the identity of that city with Pa-

* N. B. He is called by both names indifferently in the *Mudra Rakshasa*.

libothra (stated by Megasthenes, who visited it, to be the capital of Sandracottas,) follows as a necessary consequence.

Here the argument might be said to have terminated, but it may not be uninteresting to advert to some other coincidences, as well as to some discrepancies which have led many learned men to a different conclusion.

Arrian (page 214, Rooke's Translation,) who derived his information from the Journal of Megasthenes, says—

“The capital city of India is Palibothra, in the confines of the Prasii, near the confluence of the two great rivers Erannoboas and Ganges. Erranoboas is reckoned the third river throughout India, and is inferior to none but the Indus and Ganges, into the last of which it discharges its waters. Megasthenes assures us, that the length of this city is eighty furlongs, the breadth fifteen; that it is surrounded with a ditch which takes up six acres* of ground, and is thirty cubits deep; that the walls are adorned with 570 towers and 64 gates.”

The general resemblance in sound between Palibothra and Patalipootra is obvious, and would be more striking if we consider that the conversion of the Greek letter θ into “th” is an anglicism, and that the French and other foreigners do not admit the pronunciation. The Greek word *παλιβοθρα* would therefore be rendered Palibothra, and the “b” and “p” being convertible letters, we have Palipotra. But Buchanan has remarked that Pâtali and Pali are by no means identical, the former having a distinct meaning. Pâtali Devee signifies the “Thin Goddess,” whereas Pali was the name of a king, a people and a language. Wilford (p. 36, vol. IX. Asiatic Researches) says, “We are informed in the Bhagavata, that king Maha Nanda assumed the title of Bali and Maha Bali, consequently his offspring who ruled after him for a long time were Baliputras: the kingdom of Mogadha was called the kingdom of Bali, Pâli and Poli. The city in which the Bali, or Paliputras resided was of course denominated from them ‘Baliputra,’ or ‘Paliputra;’ and by the Greeks ‘Palibothra,’ and in the Pentingerion Tables, ‘Palipotra.’” In page 38, he adds, “According to Ptolemy, the country of the Baliputras extended

* N. B. This is a mis-translation for 600 feet broad. $\tau\acute{o} \epsilon\upsilon\rho\omicron\sigma \epsilon\acute{\zeta}\acute{\alpha}\pi\lambda\epsilon\theta\rho\omicron\nu$.

from the Soane to beyond Moorshedabad as far as Rungāmuttī." It seems evident, therefore, either that the Greeks confounded the name of the City with that of the Dynasty, or that the discrepancy in the name may be ascribed to the error of copyists of the Greek MSS. at a time when printing was unknown. Indeed the discrepancies in the spelling of Oriental names at the present day are quite as great, without the excuse afforded to the Greeks by successive copies of MSS. Moongeer is invariably spelt in our maps and in public correspondence, Mon-ghyr; Khanpoor or Khanpur, is spelt Cawnpoor; Chandanugur, Chandernagore; Singhalpetta, Chingleput; and Mundirraj, Madras; Dihlee is variously spelt Dilli, Dehly. The right pronounciation of Patna itself is P'ut'na; of Bankipore, Bākipoor; and of Dinapoor, Dānāpoor. The instances of such corruptions are innumerable, and will readily occur to all residents in India.

In the above quotation from Arrian, Palibothra is said to have been situated near the confluence of the Erranoboas and the Ganges. Sir W. Jones, in his Tenth Discourse, has shown that Hirunyabāhoo, or Erranoboas, was a synonyme* of the Soane. Thus the argument for the identity of the cities of Patalipootra and Palibothra is materially strengthened.

The chief objection which has been urged by Wilford, Colonel Franklin, and others against the argument is, I believe†, founded on the statement of Pliny, that Palibothra was situated 425 Roman miles below the confluence of the Jumna and Ganges, which taking the Roman mile

* N. B. All the principal rivers of India have a number of synonymes. The Ganges has, I am told, 100, which are chanted in Sanscrit verse.

A Pundit has just informed me, in reply to a question whether the Soane had any other name in Sanscrit, that it was called Hirunyabāhoo in the "Amur-kosh." I do not know whether this is the work alluded to by Sir W. Jones as being 2000 years old. The names of the Jumna, the Pundit told me, were Kalindi, Soorujumia, Jumna, and Sumunasooa.

† Since writing the above I have met with Colonel Franklin's work. His argument is founded upon some coincidences in names which appear to be more plausible than conclusive.

1st. He quotes an extract from the Ootur Poorana, to show that the original name of a small river, now called Chundun, which unites with the Ganges west of Bhau-gulpur, was "Errun Bhowuh," or Forest-barn. He considers this to be the Errunoboas of the Greeks. This petty stream has scarcely a drop of water in it for six months in the year, and in Arrowsmith's Map, on a scale of 30 miles to an inch, it is hardly distinguishable. To reconcile this fact with the description of Magathenes that "the Errunoboas was the third of Indian rivers," Colonel Franklin has construed the text to mean "a river of the third magnitude." Then putting

at the usually recognised length of 1666 yards*, would give about 402 English miles below Allahabad†, and 175 miles below Patna; Bhaugulpoor is only 364 English miles below Allahabad, while Rajmahl is 436; so that the proper site of Palibothra, according to this calculation, would be about half way between the two latter stations. Rennell, in his "Memoir of the Map of Hindoostan," has shown, however, that the Roman mile and Greek stadia varied so much that it is impossible to say what was the real length of the Roman mile given in Pliny's Itinerary. The following are the distances as given by Pliny.

	Roman Miles.		
Taxila on the Indus to the Hydaspes, (Jelum,)	120		
From Hydaspes to the Hyphasis, (Beyah,)	390		
„ Hyphasis to Hysudrus, (Sutledge,)	168		
„ Hysudrus to Jomones, (Jumna,)	168		
„ Jomones to Ganges,	112		
„ Ganges to Rhodopa,	119		
„ Rhodopa to Calinipoxa, (a City,)	167		
Carried over, ..	1244		

the Indus, Ganges, and Burumpootur in the first class; the Soane, Nerbudda, &c. in the second; he places the Chundun in the third. The Greek text however is simply *ὁ δὲ ἑρραννοβοας τρίτος μὲν ἂν εἴη τῶν. Τυδῶν ποταμῶμ.*

2nd. He next quotes extracts from the Voyu, Hari Vunsa, Markunda and Ootur Puranas, which go to show merely that Bali, the son of Bhoopt, begat a son called Balipootra, who was Rajah of Aungdes, that his capital (ninety-six miles by thirty-six in extent) was Balini, which however was usually called Chumpapoooree. Colonel Franklin says, (I do not know on what authority) that Chumpapoooree is the Chumpanugar of the present day, a village four miles west of Bhaugulpoor; but supposing this to be so, it does not follow that Chumpapoooree was ever called Palibothra. It is probable, that this Bali (who in another part of the extract is said to have had three sons "Aung, Bang and Culing," and all of whom were doubtless called Balipootras, or sons of Bali) lived long antecedent to the time of Nanda the king of Magadha, who, according to Wilford, assumed the title of Bali, and from whom Chundragupta and his descendants derived the title of Balipootras. It is very possible, that the original Bali may have dwelt at Balini, or Chumpapoooree, in the vicinity of Bhaugulpoor; but this circumstance would afford no proof that the capital of Chundragupta was also situated on that spot.

3rd. Colonel Franklin states, (page 19) that in several Hindoo works Palibothra is mentioned as situated in the vicinity of hills; but he has omitted to give a single passage containing a fact so very important to his argument. It does not seem necessary to discuss the minor points of Colonel Franklin's work.

* Adams' Roman Antiquities.

† By the Post-office Tables, it is, 227 E. miles from Allahabad to Patna.

Roman Miles.

							Brought forward, 1244
To the conflux of Jomones and Ganges,	..	..	..				225
To Palibothra,	..	..	..	..	..	..	425
To the mouth of the Ganges,	..	..	..	..	..	..	638
							<hr/>
						* Total,	.. 2532
							<hr/>

* N. B.—The total is not added up in Pliny.

These distances are said to have been measured along the high road, but as they cannot be made to correspond with the distances by the present high road from the Indus to the Ganges, it is evident either that some error as to the figures has crept into the MSS. or (which is by no means improbable) that the high road 2000 years ago took a very different course from the high road at present. Rennell, in order to ascertain the length of the Roman mile assumed by Pliny, measured on the map along the line of the great road from the Hyphasis (Beyah) to the mouth of the Ganges, and finding this to be 1140 G. miles while the Itinerary gave 2022 Roman miles, he concluded that the proportion of one of Pliny's miles to a Greek mile was as 56 to 100 in horizontal distance, or 7-10ths. of an English mile in road distance. Agreeable to this mode of computation, he found Patna to be only 345 of Pliny's miles below Allahabad instead of 425, as stated in the Itinerary. This difference of 80 of Pliny's miles, or 44 Greek miles, he did not consider of much importance, as owing to the great changes in the course of Indian rivers, it was by no means certain that in former times the confluence of the Jumna and Ganges took place at Allahabad as now.

The mode of computation adopted by Rennell is not altogether free from objection. First, he has omitted to give the stages of the high road along which he measured the distance. Secondly, which mouth of the Ganges he assumed as the eastern limit. Thirdly, the precise point which he considered to be at the mouth of the Ganges. It is also to be considered that whatever point may have been assumed by Major Rennell as the mouth of the Ganges, it is in the highest degree improbable that the same point was situated at the mouth of the Ganges 2000 years ago. The progress of the Deltas of all rivers, though slow, is sure: Herodotus (Euterpe, p. 4) says that, "In the

time of Menes (*2320 B. C.) the first king, the whole of Egypt, except the province of Thebes was one extended marsh. No part of all that district which is now situate beyond the lake of Mæris was then to be seen, the distance between which lake and the sea is a journey of seven days." In para. 13 he adds, "In the reign of Mæris as soon as the river rose to eight cubits, all the lands above Memphis were overflowed; since which a period of about 900 years has elapsed: but at present, (about 460 B. C.) unless the river rises to sixteen or at least fifteen cubits, its waters do not reach those lands." During the boring in Fort William with a view of making an Artesian well, a fossil bone was brought up from a depth of 350 feet† below Calcutta, which evidently proves that that part of the Delta is (geologically speaking) a comparatively modern accumulation of alluvial deposits, and it is not impossible that Calcutta itself may at that period have been not far distant from the mouth, or one of the mouths, of the Ganges. According to the Mosaic account, or rather the ecclesiastical interpretation of it, the world is not yet 6000 years old. If therefore it has taken 6000 years to form the Valley and Delta of the Ganges, it may be assumed that it must have taken 2000 years to form a third of that deposit. The exact point at which the Ganges flowed into the ocean at the period of creation is a geological nut, which I would differentially submit to be cracked by Dr. Buckland, or Mr. Lyell. Geology, however, has unfortunately proved that the Mosaic chronology refers to the creation of man, and not to that of the globe. The age of the latter seems to correspond more nearly with the endless Yugs of the Vedas and Poorâns, than with the more limited traditions of the Pentateuch and Talmud.

Although Rennell's estimate of the Roman mile is open to the above criticism, we may fall back upon that of D'Anville, a geographer cele-

* This date is taken from Wilkinson's Egypt.

† See Vol. vi, page 236, Journal of Asiatic Society; also vol. ii, page 650.

The rise of the land according to the calculation of Herodotus, would be one foot and four inches, (1 f. 4 i.) in a century. In 1702 A. D. the favorable height of the Nile was 23 cubits, (being an increase of 7 cubits, or $10\frac{1}{2}$ feet), in about 2162 years, (1702 + 460) or 5 inches and 8-10ths in a century. Taking the mean between 1 f. 4 i. and 5 inches $\frac{8}{10}$, viz. 11 inches as the average rate per century, and supposing the rise of the Ganges to have been at a similar rate, a period of 38,181 years would be required to fill up the 350 feet of sand, and alluvial soil below Calcutta; but it is probable that the rise was much more rapid prior to the reign of Mæris, i. e. 3062 years ago, (900 + 2162) than subsequent to that date—at even 2 feet to the century however, it would require 17,550 years!

brated for an accuracy in details, which was praised by Sir W. Jones, and which even Gibbon* said he was afraid to dispute. Rennell observes in a note, "D'Anville is of opinion that Pliny turned the Greek stadia, (of Megasthenes) into Roman miles at the rate of eight to a mile, and thus accounts for their shortness. D'Anville, who has gone deeply into the subject, thinks that it requires 1050 Itinerary stadia to make a degree of the great circle." Now a degree of the great circle being equal to 60 geographical, or 69 English miles, 425 of Pliny's miles, or 3400 Greek stadia, would be equivalent to 223 E. miles, which is only four miles less than the real distance from Allahabad to the Golah at Patna, as given in the Polymetrical Tables of the General Post Office. So that if the estimate of the Greek stadia given by the most accurate of geographers be adopted, the difficulty of reconciling the distance given by Pliny with the site of Patna is altogether removed.

Beyond the evidence of history and tradition, however, little or nothing remains to indicate Patna to have been the site of an ancient city. It is probable that a great part of the original city has been swallowed up by the Ganges. In a map lately constructed by the Revenue Survey, and from decrees of the Civil Courts, it appears that the main stream of the Ganges even so late as the Permanent Settlement, or 1790 A. D. was several miles north of its present course. The river is gradually wearing away the southern bank, and the modern city is likely to share the fate of the old.

In point of extent the modern town, including the suburbs, does not fall very far short of that of the ancient. Megasthenes states Palibothra to have been ten miles† long, and about two broad, surrounded with a ditch, and walls adorned with 570 towers and gates. The length of the present town from the Golah at Patna on the west to Jafir Khan's garden on the east, is about the same length; but the breadth cannot exceed a mile. It is just possible that the "Sotah," or bed of a small stream, exhibited in the map as running south of Patna from Phoolwaree to near Futwa, may have been the ancient ditch of Palibothra, as it does not appear to have been ever the main stream of the Soane. Of the gates and towers no traces remain. There are, however, some high artificial eminences composed of brick-work, called "Punj Puharee," or five hills, about a mile or two south of the town, which may be the ruins of bastions or towers. There are likewise some

* Miscellaneous Works.

† Calculated on D'Anville's principle, it would be much less.

other singular elevations in different parts of the town or neighbourhood, evidently composed of the ruins of buildings of considerable magnitude. One near the Durgah of Shah Arzān, another at Bikna Puhāree, on which a large European house has been built, another near what is called the Dutchman's house, and a fourth at Chujjoo Bagh, on which the house I reside in is situated. It must be admitted, however, that tradition does not agree in assigning such an origin to these elevations. As the southern bank of the Ganges gradually gives way to the undermining power of the current, several old brick wells, long since closed and built over, have been discovered, and in the rainy season many ancient Hindoo coins gold, silver, and copper are found. Gold ones of the Gupta or Canoge series, and Boodhist coins of cast silver and copper are the most common.

It is not, however, a matter of surprise, that the waves of time should have obliterated what those of the Ganges may have spared, in a country where the destructive power of vegetation is so great and rapid.

In 2000 years how many cities, empires, and even religions, have passed away ! Of Babylon, Susa, Ecbatana, and Persepolis, cities cotemporary with Palibothra, scarce a stone remains to mark their site to the puzzled antiquary. " Assyria, Greece, Rome, Carthage, what are they."*

The empires of Montezuma and the Incas have likewise risen, flourished, and disappeared within that period. The religions of Zoroaster, Osiris, Jupiter, and Odin, have been superseded by that of the Crescent or of the Cross. When cotemporary cities have perished, and cotemporary empires have decayed, there is little room for wonder that nothing should remain of the capital of Chundragupta save a few mouldering heaps.

Tempus edax rerum ! tuque in vidiosa Vetustas,
Omnia destruitis ; vitiataque dentibus ævi,
Paulatim, lenté, consumitis omnia morte.

Omnivorous Time ! and thou invidious Age,
Consume all things in thy wanton rage.
Worn, day by day, by Time's remorseless teeth,
Man and his works at last must sink in death.

E. C. R.

JOURNAL

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Translation of the Toofut ul Kiram, a History of Sindh. By.

Lieut. POSTANS.

[Continued from page 99.]

*Account of the circumstances attending the death of Mahamed
Bin Cassim.*

Thus, when the two daughters of Dahir, *Purmul Deo* and *Suruj Deo*, who were on the howdah with him, arrived for the service of the Khalif, he saw that they were extremely beautiful, and appropriated them to himself; still, in order to dissipate their shyness and distress, he committed them to the care of the keepers of the Harem, and after a time called one to his bed. Now since the death of their father had sorely afflicted them, she said, "I am not for the Khalif, for Mahamed *Cassim* took me to himself for three nights." The Khalif on hearing this was enraged, and at once wrote an order himself and despatched it, to the intent, that on seeing that order, he, Mahamed Cassim, should cause himself to be enclosed in a raw hide and sent to the presence of the Khalif. This order was received by Mahamed *Bin Cassim* at *Yassur*: sufficient was it that the order was from the potentate, to which there is but obedience; he was sewed up in a raw hide and sent off: on the third day he died; they put his body in a box and took it to the Khalif, who immediately called the two women and said, "See how absolute is my power." They laughed and said, "In the accomplishment of the wish of the Khalif there is no wavering; but in justice and wisdom there is neither foresight or discrimination, seeing the man, who treated us as if he were our father and brother, on our

simple words, longing as we do for revenge, without enquiry into the truth or falsehood, has been destroyed : our wish was retribution for our father's death. *Mahamed Cassim* moreover was deficient in wisdom ; he should according to the order have started on his journey, but have delivered himself from the hide after one day, and have arrived alive : we have undoubtedly told the truth in our evidence, and we resign our lives." The Khalif was ashamed, and ordered them to be tied to the foot of an elephant and dragged through the bazar and burnt.

The Khalifs of Bini Oomai and their Deputies.

After the conquest of Sindh by Bin Cassim, according to what has been related, *Harraf Bin Keiss Bin Rawah Assadi* Deputies of the Khalifs of Bini Oomai. remained in charge of Alor, and the individuals before mentioned were governors as appointed. After them the people of Hind became rebellious, and from the confines of Dibalpur to the sea, remained in the hands of the Moslem deputies. After a time *Abu Hifaz, Bin Kutibah, Bin Mussilim* arrived from *Hijjaj*, and punished those who had not embraced the true faith : the (Hindoo) deputies being helpless, fled to Khorassan. About that time *Jamin Bin Zeid* also arrived from *Hijjaj*, and on the part of the Khalif *Suliman Amin Bin Abdul-lah*, openly obtained the government of Sindh ; and in the year 100 H. *Oomur Bin Abdul Aziz, Bin Umeer, Bin Muslim* came to conquer Hind. He took some of those countries, and made some of the tribes of Sindh Mahomedans ; but in the time of the *Khalif Hasham*, they seceded. *Suliman Bin Hashan*, as is related in the first vol., fled from the army of *Mirwan* and came to Sindh, where, intent on rebellion, he remained until *Saffah* obtained the Khalifat ; he then embraced the service of *Saffah* : also *Abul Khitab* arrived on the part of *Mirwan*.

The period of the government of the deputies of the Khalifs of *Bini Oomai* extended from the year 93 until 133 H. All

The authority of the Khalifs of Bini Oomai over Sindh extends to the year 133 H., for a period of 40 years. this period from the commencement of the 93 H. until the period mentioned, is 40 years. Since the government of the deputies of the Khalifat of the

house of *Bini Oomai* was as described, now it is necessary to relate the government of the deputies of *Bini Abbas*. Still there are a few circumstances connected with this period which must be related, and which I shall compress as briefly as may be.

Let it not be concealed, that when the deputies of *Bini Oomai* took *Sindh*, some of the dependencies of the country were yet disobedient to the great authority (of the Khalifs.) In short, *Diki Rahi*, descended from the *Rahis*, was in the city of *Dihir* a place of renown, and *Bim-hul Rahi* was at *Bhunbur*, which city he had founded.

Account of the Deputies of the Khalifs of Bini Abbas.

When *Saffah*, who was the first Khalif of *Bini Abbas*, came to the throne, in the year 133 H., he sent a force under *Da'ud Bin Alli*, and the government of *Sindh* was taken from the deputies of *Bini Oomai*. After four years *Abu Jaffir Mimsur Abbasi*, ordered and prepared an army for *Sindh* and *Hindoostan* : in the time of *Harun Reshid*, *Moussa* the brother of *Fazil* came from *Mecca* to the governorship of *Sindh*, but, giving away all he obtained, he was dismissed. *Alli Bin Isa*, *Bin Haman* came in his place ; at this time the fort of *Tibm*, an impregnable fortification near *Sahurah* and the city of *Bakar*, and other places in that vicinity, westerly from *Sindh*, were in the hands of *Sheikh Abdul Tihrah*, whose tomb with those of other holy men (martyrs) are still places of pilgrimage to true believers, and on the top of the dome it is written, that he died in the year 171 H. The city of *Bhunbur* having been destroyed, they proceeded elsewhere. At length *Abul Abbas* arrived as governor of *Sindh*, and remained there a long period. In the time of *Mam'on*, some further portions of *Hind* were added to the possessions of their deputies. After him, other individuals were appointed from *Bagdad* to the governorship of *Sindh*, until during the Khalifat of *Abdul Kadir Billah al Abbas*, when *Abmed Assak*, *Bin Ahmukhtidar Allah*, was appointed. In the middle of the month

416 H., 1025 A. D. Mahmud of Ghuzni takes possession of Sindh, and terminates the authority of the house of Abbas after 283 years.

Ramzan 416 H., Sultan Mahmud Ghazi arrived at Multan from Ghuzni, and having captured *Ooch*, drove out the deputies of *Abdul Kadir* from the country of *Sindh*. The period of the government of the deputies of the Khalifs of *Bini Abbas*, from the commencement before mentioned is altogether 283 years.

The tribe of *Sumrah* had 200 years previously taken possession of certain portions of *Sindh*, but as they had paid tax and tribute, and had been obedient to the Moslem governors, no mention

Tribe of Sumrah to be described hereafter.

has been made of them : but after having related the

dynasty of the deputies of Ghuzni, and considered the emperors of Delhi, we will relate the rule of some of the above-mentioned tribe.

List of the Deputies of Ghuzni, and narrative of the Emperor of Delhi.

As before mentioned, *Abdul Rizak* the minister of *Sultan Mahmūd* Ghuzni deputies. *Ghazi*, in the year 417 H. having taken Bukkur, arrived at Sewistan and Tattah, and the governors of *Bini Oomai* and *Bini Abbas* had not remained there, except a small portion who had formed connections, and were encumbered with families: they were men of note, and received stipends from the government.

From amongst these were 18 families, the heads of generations.

Briefly: the *Sukufts*, a family of Cazis originally of Distinguished heads of families.

Bakar and *Alor*, from the descendants of *Mussa Bin Yakub, Bin Tahi, Bin Mahamed, Bin Shibani, Bin Ushman Sukuft* who, with the *Cazi Ismail, Bin Alli, Bin Mussa, Bin Tahi* were the first relaters of the conquest of Sindh in Arabia, and their great grand-father *Mussa Bin Yakub*, was confirmed by *Bin Cassim* as *Cazi* of *Alor* after the conquest of that fort: and the "*Tamims*" and "*Hal Mogheirahs*," (which term became slightly changed to *Hal Tuhim* and *Ibn Soriah*,) and the *Abbasis* and *Sadihs, Farukians* and *Ooshmamans*, who up to this present time are to be found in all Sindh; and the *Phonwarans* descended from *Haris* and the tribe of *Mungi*, a branch of the *Tamins*, the family of *Jubiriah*, of whom *Sheikh Tahi* in the account of *Hullani* will be mentioned; and the family of *Bini Assad*, of whom is *Sheikh Mirtah*, will be alluded to at *Futtipur*; the family of *Hal Hutbeh* of whom is *Cazi Bahran*, he also will be referred to at *Futtipur*; the family of *Benwabi Sufian*, of whom are some dervishes of *Rahib*; the family of the tribe of *Bajur*, governor near *Jehanker*, the descendants of *Jaremah Jusari*, of whom is the tribe of *Sapiah*, who are the possessors of *Sewistan*; and the *Jhutts* and *Beloochees* are originally from *Harun Mikrani*, and it will be more convenient to relate the genealogies of the *Beloochees* and *Jhutts* without delay.

Origin of the Jhutts and Beloochees.

Mahamed Bin Harun Mikrani, who has been mentioned in the account of the officers of *Mikran*, and who came with *Mahamed Cassim* at the time of the conquest of Sindh as far as *Armanbihah*, where he

died and was buried, is the son of *Mahamed Haban, Bin Abdul Rahim, Bin Hamzeh, Bin Abdul Mathab*. Once, when *Meer Hamzah* (may God approve him) went out to hunt in a country far in the desert, he became alone there, and, according to the favour of the Most High who is always propitious to good and great men, a good genius or fairy appeared to keep him company; by the Divine will he embraced her, and she became hidden from his sight: afterwards she brought forth *Abdul Rahim*.

In short, Mahamed Bin Harun had fifty-two sons by seven wives. Thus, one: *Isa, Mikran, Hijaz, Satak, Bikram, Rustum, and Jillah* from one mother named *Hamira*; *Zumal, Mazid, Radah, Buhlal, Shahbab, Nizam, Julal, Marid*, from one mother named *Hamiri*; *Roe-din, Mussa, Noki, Noh, Mundah, Raza-al-din*, from *Miriam*; *Jullal* from *Hashiat*; *Adam, Kumal, Ahmed, Humad, Hamud Said, Masud*, from *Musma*; *Mudi, Shir, Koh, Babund, Kark, Nowar al din, Hus-san, Hasein, Suliman, and Abraham*, from *Fatimah*; *Alim, Alli, Tir-kush, Buhpad, Teghzan, Mubarik, Túrkh, Tallah, Arbi, Shiraz, Taj-al-deen, Takht, Gulistan, and Búrkh* from *Khwah*. When, according to the order of *Hijaj* as related, *Mikran* was cleared, that land with others was appointed into two shares, and one share was given to the descendants of *Jallal al deen*, and they came to *Sowah* and *Kich*,* and their descendants are to this day scattered in great numbers all over Sindh. The tribe of *Lodah* also called *Lulian*, have their origin thus. The illustrious *Suliman* sent familiar spirits in the shape of men to purchase slave girls at *Rúm*. On their return, one of these had connection with one of the women; *Suliman* gave her to him, and a boy was born: afterwards his descendants mixed with the Arabs, and came to Sindh at the time of the conquest, or before.

Account of the origin of the tribe of Sumah.

The narrative of these people, as is necessary, will be fully told in the course of this history. *Sam*, who is said to have been the son of *Amúr*, the son of *Sham Bin Abal Sukub*, and again the son of *Umar Bin Akrameh Bin Alu Jahul*, or the son of *Akrameh Bin Abul Hisam, Bin Abbu Jihil*: there are, however, various reports, of which the following is the most consistent. That they were de-

* Kich Mikran.

scended from *Jamshid*, whence they took the title of "*Jam*," with which they were distinguished; or else they were from *Sam* the son of *Noh*: he had four sons, the first *Budha*, (his descendants were *Budh*, *Sodah*, *Sittah*, *Ahkil*, *Ootah*, *Amiah*, *Hazir*, and in short there were sixteen sons generally known by the title of *Rathur*,) and the second *Sankah*, the third *Hami*, and the fourth *Bhakirat*. This *Bhakirat* had a son called *Dusrut*. Now *Dusrut* had three wives, one named *Kila*, the second *Kuliah*, and the third *Simah*: from *Kila* there were two sons, one named *Ram*, the other *Lukhman*; from *Kuliah* one son *Barat*; and from *Simah* one son *Chutur Kim*. To *Sunkah* the son of *Sam* there were also descendants, and also to *Hami*; they were called *Judur*. *Barat* the son of *Dusrut* had descendants called *Purhur*, *Jansipar*, *Gorijah*, and *Rahih Chatar Khan*; the son of *Dasrat* had descendants, called *Charah*, *Lukhman*; son of *Dasrat* had no children; *Ram* had one son, who had a son called *Tawakus*, who had a son called *Tatal*, who had a son called *Nirhanat*; his son was called *Kin*, (the city of *Kin** is so called after him.) The son of *Kin* was entitled *Sambat Rajah*. *Sambat Rajah* had four children: 1, *Sam Bir Kirarah*, also called *Sham*; 2, *Nikrat*; 3, *Dakhlan*; and 4, *Madah*. In short, *Sam* the son of *Sambat Rajah*, had a son called *Jadim*. *Jadim* had four sons: first, *Habit* whose descendants are the *Sumahs* of *Sindh*; the second *Kajbit*, whose descendants are the *Chughdah*; the third *Buhobut*, his descendants are the tribe of *Bhati*; the fourth *Chira Sumah*, of his descendants is *Rahi Diach*, the governor of *Kurnal*, a fort situated in the land of *Soorteh*: he became a martyr, and the tale of the love and devotion of his wife is well known. *Habit* the son of *Jadim*, the son of *Sam*, the son of *Sambat Rajah*, had a son named *Rubdari*; he had a son called *Mijat*, he had *Nootyah*, he had *Udha*, he had *Udheh*, he had *Lakyah*, and he had *Lakah*. *Lakah* was a sovereign, and married into the *Bhati* tribe: he had four sons. Thus, first, *Udhuh* without children; *Udhuh*, which was his place of abode, is called after him. Second, *Mahir*, who had four sons: 1, *Sitah*; 2, *Waditar Patheria*; 3, *Wirhah*, without children; and 4, *Sand*, also without children. They say that the above-mentioned *Lakah* mar-

* "*Kin* and *Kashmir*," as they are called in *Sindh*, on the southern confines of the *Seikh* territories; they formerly belonged to *Sindh*, but now belong to *Multan* and the *Seikh* government.

ried again in his old age, and had four sons. First, *Oomur* ; second, *Jeyur*, (his descendants are *Babrahs*, *Dukemehs*, *Kulah* ;) third, *Phul Lakah**, (the *Philani* are known as his descendants ;) fourth, *Munayyah*. *Oomur* the son of *Lakah* had a son named *Lakah* ; he had a son named *Sumah*, who had two sons, one named *Kakah*, and the other *Jikrah*. *Kakah* became a ruler, (the place called *Kakah* is so called after him ;) he had two sons, one *Palli* and the other *Raydin*, from the descendants of *Palli*. *Musruk Sumah* became a governor, and *Raydin* had nine sons. Thus : first, *Sumah*, the *Samijahs* are his descendants ; second, *Notyar*, all the *Nouts* are his descendants ; third, *Lakah*, his descendants are *Lanjar*, *Mukdoom*, *Sihar*, *Lanjar*, (God's mercy be on him) of whom mention will be made in the account of the Sheikhs, belongs to him ; fourth, *Abrah*, whose descendants are *Daod*, *Zahir Nayah* and *Fal Nayah* ; fifth, *Nayah* ; sixth, *Chamir* ; seventh, *Munhayah* ; eighth, *Koriah* (the descendants of these three last tribes are the *Mundrah* ;) ninth, *Palli* who was a chief and had two sons, first *Oodah*, whose descendants are the *Bariah* *Oodejah* (also called *Gordrah Putrah*,) and second *Saud*, who was the chief of the tribe. *Saud* the son of *Palli* had seven sons : first, *Kakah*, whose descendants are the *Kakejah Putrah* ; second, *Jarah*, who had descendants the *Jahiejahs* ; third, *Waderah* ; fourth *** ; fifth, *Hingarrah*, his descendants are *Hodejah*, *Juksia*, *Wurha* and *Hingoja* ; sixth, *Dirah*, his descendants are *Dirah Sumah* in Cutch ; seventh, *Jam Hoti*, who had five sons ; first, *Halah*, his descendants are known as the *Halah* ; second, *Hingorah*, his descendants are *Bumian*, *Ruhuriah*, *Hingorah*, and they founded the places thus mentioned ; third, *Sahi*, his descendants are *Sahir Sumah* ; fourth, *Chalidriah*, his descendants are well known as *Nihirah* ; fifth, *Jam Hapur*, who had two sons ; first *Raojah*, second *Jam Jumur*, who had a son *Kirraha* ; he had three sons : first, *Saudh*, whose descendants are *Raoma*, *Lakayat* and *Jekrah* ; second, *Sumrah*, who had no children ; third, *Lakah Jan*, who had one son *Kalah*, who had a son called *Lekah* ; after whose death he had another called *Brekanah*, he took the name of his father. *Lakah Bin Kahah*, the brother of *Nahah*, had twelve sons : thus, first, *Jam Jumur*, from whom are descendants the *Sumahs*, the rulers of Sindh residents of *Sanuir*, who will be mentioned

* "Laka Philani," an heroic Rajpūt prince, well known in Cutch traditions ; the Jhareejahs of Cutch date their origin from the *Sumahs* of Sind, (see Mrs. Postans's "Cutch," or the traditions of "Laka Philani.")

in their proper places; second, *Oomur*, who ruled in *Buhriah*, he had no children; third, *Palli*, whose descendants are *Palli Sumah*; fourth, *Kahah*, his descendants are *Sodiari Sumah*; fifth, *Hoteh*, his descendants are *Sahib Sumah*, *Hoteh Sumah*, and *Schawuttel Sumah*; sixth, *Jeysur* (or *Jeyur*), whose descendants are the *Beyah Purya*; seventh, *Mangur*, without children; eighth, *Abrah*, whose descendants are the tribe of *Abrejahs*; ninth, *Hingorah Konur*; tenth, *Sultan*; eleventh, *Rayidam*; twelfth, *Lakah*. In short, *Hingorah Konur* had three sons: first, *Deysur*; second, *Minayah*; and third, *Miradeyah*. *Deysur* had five sons; *Kah*, *Halah*, *Rukun*, *Hingorah*, and *Jonah*. *Jonah* the son of *Lakah*, above-mentioned, had five sons: first, *Khoreah*; second, *Tajiah*; third, *Abrah*; fourth, *Beloch*; fifth, *Babniah*. The account of the descendants of *Babniah*, who ruled in *Sindh*, will be mentioned in the dynasty of the *Sumahs*.

Let it not be concealed, that according to what has been related,

Sumahs are the principal inhabitants of *Sindh* and *Guzerat*, (i. e. *Cutch*.)

the descendants of *Sumah* are to this day the principal natives of the countries of *Sindh* and *Guzerat*, and *Sindh* was previously cultivated and inhabited by them. Besides this tribe, the *Jhatts* and *Beloochees* and the descendants of others as alluded to, were from the older

time inhabitants of that country: others might also be enumerated in addition to these, but since it was not intended in this work to make other than an abbreviated account, and to adhere to a few events which are most interesting, if any one should require further particulars let him look for them (elsewhere.) In short, after the deputies of

Sultans of *Delhi*. Sultan *Mahmūd*, those of Sultan *Masud*, Sultan *Modud*, then of Sultan *Mahdud*, then of Sultan *Kutub Aldin*, then the deputies of *Sultan Aram Shah*, all of whom are mentioned in the 1st and 2nd vols. as connected with *Sindh*, came to that country, and during the time of the Sultanut, it was divided into four portions; *Multan*, *Ooch*, and the whole of *Sindh* fell to the government of *Nasir Uldin Sibajah*, and at that period seven Rajahs in *Sindh* from

the places which shall be mentioned, paid tribute to *Multan*. First, *Rana Bhansur Satah Rathur*, residing at *Zihrah*, belonging to *Dirpilah*; second, *Rana Sami*, son of *Dimach Kirecheh* of the tribe of *Sumah*, belonging to *Turk* in the territories of *Rupah*; third, *Jeysar*, son of *Hijah Machee Solanki*, inhabitant of *Maunktan*; fourth, *Wahijah*, son of *Panun Chunun*, belonging to *Dirah*

Siwe, fifth; *Chunun*, son of *Dehtuk*, of the tribe of *Chund*, inhabitant of Bukkni; sixth, *Zeyah*, son of *Durya*, inhabitant of *Julan* (viz. *Hami Kot*); seventh, *Jiswad Dirhan Agrah*, inhabitant of *Min Tukar*, belonging to *Bhanirwah*. In short, when Lahore was taken by the deputies of *Taz-ul-din Yelduz*, the prince *Nasir-ul-din Kibajih* retired to Multan, and at the end of the year 623 H., *Mulk Khan Khilzye* and

623 H. Mulk Khan
Khilzye takes Sewis-
tan.

his followers took possession of the town of *Sewistan*. Sultan *Itimus* sent his minister *Nizam-ul-*

Mulk, Mahamed Bin Assad, to besiege *Ooch*, and he himself proceeded to Delhi. *Nizam-ul-Mulk* in the year 625 H., took *Ooch* by negotiation, and proceeded towards Bukkur; *Nasir-ul-din* fled and died, Sultan *Shums-ul-din* became master of Sindh. *Noor-ul-din Mahamed* in the year 630 H. was governor of Sindh; and in 633 Sultan *Itimus* died, and *Massud Shah* was his heir. In the confusion of events, a Moghul army crossed the river of Sindh and besieged *Ooch*; but, being defeated by Sultan *Mussud*, fled to Khorassan. Sultan *Mussud* sent *Mulk Jullah-ul-din* in the place of *Noor-ul-din* as governor of Sindh, and at this time *Masir-ul-din Mahamed*, uncle of *Sultan Massud*, became heir to the throne and crown, and in the year 649

649 H. Sultan Mas-
sud gives Sind to
Mulk Sunjur.

having passed through Lahore, Multan, *Ooch* and the whole of Sindh, he gave that country to *Mulk*

Sunjur and returned; and in the beginning of the year 663, Sultan *Ghias-ul-din* succeeded to the throne of Delhi, and

663 H. Sultan Ghias-
ul-din succeeds to
the Delhi throne.

gave the government of Lahore, Multan and Sindh to his son *Sultan Mahamed*, and after three years he

returned to the service of his father at *Delhi*, and returned again after a year. In the year 683 H., *Sultan Mahamed* was killed by the troops of *Jenghiz Khan*, and his son *Key Kosun* succeeded him. Sultan *Julal-ul-din Khiljy*, in the year 693 H. arrived at Lahore, and gave Multan and *Ooch* in charge to his son *Arkuli Khan*, and *Nusrut Khan* remained to govern Sindh. In short, in the year 695 H., *Sultan Hullaw-ul-din* sent his brother *Shah Khan* to drive out *Arkuli Khan*; but *Nusrut Khan*, as formerly, with a force of 10,000 retained possession of Multan, *Ooch*, Bukkur, *Sewistan* and *Jattah*. In the beginning of the year 697 H., there was a report of the march of a Moghul force from *Seeistan* to *Sewistan*, and it (*Sewistan*) was captured. *Nusrut Khan* released himself. At the close of the rule of the Sultan

Hillaw-ul-din, *Ghazi Mulk* was sent with 10,000 Sowars to Dibalpur to drive out the Moghuls of *Jenghiz Khan*. Multan, Ooch, and Sindh were made over to him as a jahgir, but in the revolution of events *Kosun Khan* usurped the throne from his father. *Ghazi Mulk* taking the army of Multan, Ooch and Sindh, overthrew *Kosun Khan* and took the throne, and he was styled Sultan *Ghias-ul-din*. At this time the

men of *Sumrah* came forth and took possession of Jattah. The tribe of *Sumrah* take possession of Jattah. Sultan *Ghias-ul-din* sent *Mulk Jaj-ul-din* to

Multan, *Kwajeh Khatria* to Bukkur, and *Mulk Hale-shir* to Sewistan. After a time when *Mulk Kush-koo-Khan* became rebellious in Multan, *Sultan Mahamed Shah*, the son of Sultan *Ghias-ul-din*, in the year 723 H., came to Multan and subdued him; then having placed confidential servants at Bukkur and Sewistan, he returned.

751 H. *Jaghi Ghul-lam* invades Sindh. In the year 751 H., *Jaghi Ghullam* having arrived at Jattah from Gujrat, Kach, and other places, pitched at Jahir on the edge of the river; but being annoyed with fever, he marched from thence and came to *Kandul*, where he recovered, and returned to Jattah; from which he remained and surrounded Jattah on four sides, but he died of the same complaint as above-mentioned. *Sultan Feiroz Shah* then possessed the throne. *Jaghi* was at Jattah,

and hearing of his death he attacked the men of *Sumrah*, the *Jharajahs* and *Sumahs*, and was defeated. The *Sumrahs* and *Jharajahs* defeat *Feiroz Shah* at Jattah.

The Sultan in the beginning of the month of Safar of the above year, marched from the neighbourhood of Jattah on the river *Sankrah*; he directed a fort to be built. *Ami Nasur* remained there with 1000 horse; he built a city called Nusurpur, and he appointed *Mulk Bihram*, chief magistrate in those districts; he built *Bih-rampore*, and *Mulk Allishir* and *Mulk Jaj Kafuri* were left at Sewistan as governors. He then proceeded to Bukkur. *Mulk Kuknahdin* and *Mulk Abadul Aziz* were appointed Naib and Dewan, with a party of trusty men as guardians of the fort; and *Mulk Kuku-ul-din* had the title conferred on him of *Ikhlas Jani*, and was made governor of all the country of Sindh. The Sultan then returned to Delhi. After this, in the year 773 H. having determined to take Nuggur Kot, he came to

Jattah; *Jam Kheir-ul-din*, the governor of Jattah, defended himself in the fort, surrounded by water, and the Sultan by reason of the want of grain and the

773 H. Sultan Fei-roz Shah comes again to Jattah.

abundance of musquitoes, returned to Jattah. *Jam Kheir-ul-din* being promised pardon, proffered his service; he took with him all the *zumeendars* to Delhi, but when they reached *Sehwan* it was discovered that the *Jam* meditated escape; he was chained and imprisoned. After a time *Jam Junur*, son of *Jam Kheir-ul-din*, was invested with the governorship of Jattah, and in the year 790 H. *Feiroz Shah* died, and

790 H. Death of
Feiroz Shah.

Sultan Jughluk Shah succeeded him; after him, *Sultan Abu Bukur*, then *Sultan Mahamed Shah*, then *Sultan Sikundur Shah*, then *Sultan Nasir-ul-din*, came to the throne of Delhi: he sent *Sazang Khan* to take possession of *Dibalpur*, *Multan* and *Sindh*; and in the year 800 H., *Mirza Pir Mahamed Nezah*, a noble of *Timûrs*, crossed the river of *Sindh*, and invested the fort of *Ooch*. *Mulk Alli*, who on the part of *Sazang Khan* was in that place, resisted for a month. *Sazang Khan* sent *Jaj-ul-din Khan* with 4000 men to assist him; he released *Mirza Pir Mahamed*, and defeated *Sazang Khan*: he invested *Multan*, and after six months *Sazang Khan* became obedient and delivered up *Multan*. At this time *Sahib Karan* in the year 801 H. descended on *Multan*: from this period the Sultans of Delhi lost

801 H. The power of
the Delhi sovereigns
in Sindh decline.

dominion in *Sindh* over the governors in that country, who themselves obtained power.

The Tribe of Sumrah.

Some of this tribe ruled in parts of *Sindh*, as has been mentioned, previous to this. Thus the whole time that their authority extended was 550 years; and therefore, after the descendants of *Jamim*, the last of the deputies of *Bini Abbas*, seeing their power, the narrators of history began to make mention of them; at that time, as will be mentioned, the government of *Sindh* passed to the *Ghoris* and *Ghuzniris*, and this tribe of itself became powerful, as will be related.

And now the origin of this tribe is not clearly traced; but they were evidently old inhabitants of the country, and they are apparently connected with the descendants of "*Sindh*." In short, according to what has been previously related, when in the year of 720 H. *Ghazi Mulk* collected the army of *Sindh*

Origin of Sumrahs
obscure.

and Multan, and took it to Delhi and subdued *Khosrow Khan*, he succeeded to the throne; and Sultan *Ghias-ul-din*, *Jughluk Shah* was his

title: whilst he was occupied with affairs in that quarter, the men of *Sumrah* collected from the vicinity of *Jhuri* and placed a man named *Sumrah* in the governor's seat, and, having possessed the country, he espoused the daughter of a zumeendar named *Saud*, who was of power and rank: by her he had a son, named *Bangur Khan*. *Sumrah* died, *Bangur* succeeded him, and his son *Dodah* took possession of the country to *Nusurpur*; he had a son named *Sungar*, a minor, and the government of the country came to *Jaree*, daughter of *Dodah*; and when *Sungur* became of years he succeeded to the governorship, and proceeded towards *Cutch* and subdued the country to the river *Manak*. As he had no children, his wife *Heimus'* brother was appointed governor of the city of *Toor* and *Thurri*. After a short time *Dodah Sumrah*, who was governor in the fort of *Dakah*, collected his tribe from the surrounding country, and extirpated the brother of *Heimus*. At this time *Dodu* and *Phatu*, descendants of *Dodah*, came out with a large force, and gave him the chieftainship; he ruled for some time, and after him *Kheira* took possession of the country; then *Armil* succeeded to it, but being an oppressor, the men of *Sumrah* collected and killed him; this was in the year 752 H.: but the beginning and end of this tribe as rulers is by others otherwise related. Thus in the *Muntukhib al Juwarikh*, when *Sultan Abdul Rashid*, *Bin Sultan Mahamed Ghazi*, succeeded to the throne, his imbecility caused the inhabitants of *Sindh* to be rebellious, and in the year 445 H. the men of *Sumrah* collected near *Thurri*, and placed a person named *Sumrah* in the governship. *Sumrah* possessed his elevation for a long period, and had a son *Bangur* by the daughter of a zumeendar named *Saud*, and died. *Bangur Bin Sumrah* ruled for 15 years; in the year 461 H. he died: after him *Dodah Bin Bangur* governed for 24 years, and in the H. 485 he died. After him *Sungar* for 15 years; after him *Huff* 36 years; after him *Oomur* 40 years; *Dodah* the second 14 years; *Phutto* 33 years; *Kheysurah Dodah* third 14 years; *Jahi* 24 years; *Chami* 18 years; *Bangur* second 15 years; *Hafif* the second 18 years; *Dodah* the fourth 25 years; *Oomur* the second 35 years; *Bangur* third 10 years: after him *Hamir* succeeded to the govern-

445 H. The *Sumrahs* placed *Sumrah* on the musnud.

Descendants of *Sumrah*.

The Sumahs over-threw the *Sumrahs*. ment, but being a tyrant, the tribe of *Sumah* over-threw him, which will be mentioned in the course of the history of that tribe. *Oomur Sumrah* founded the fort of *Oomur Kot*; *Dilu Rahi*, son of *Dilu Rahi* before-mentioned, governor of *Dilu*, was a tyrant and given to infamous practices: to his tyranny and oppression is ascribed the destruction of Alor.

Account of the destruction of the City of Alor.

It was a custom of that unjust tyrant to take half the property of every merchant who arrived from Hind as duty and tax, and he seized the wives of the inhabitants. A wealthy and influential merchant who had the

Legend of the destruction of Alor, through the tyranny of Dilu Rahi.

title of *Seif-ul-Mulk*, and a few other princes with him dressed as merchants, but who were on pilgrimage to Mecca, being ignorant of that villain's proceedings, entered his capital: the merchant had with him a beautiful woman named *Budeh-al-Jumal*; at that time the river *Mihran* ran close to Alor. Hearing of the beauty of *Budeh-al-Jumal*, *Dilu Rahi* became anxious to possess her, and wished to arrest the merchant under the pretence of his intending to smuggle his goods. The unfortunate merchant for three days tried to persuade the tyrant, and vented his complaints mightily to the Most High; and as the supplications of the afflicted are accepted, he was inspired with a dream, that in the morning he should conceal himself, and taking a party of stone-cutters famous as *Firhad*, and having bribed them well, during the following night cut a passage, through the hills for the passage of the river, large enough for a boat, and on the other side erect a strong embankment. Although both these appeared impossible tasks, yet by the help of the Almighty they were accomplished. The merchant with his boats passed safely by that road; and the river *Mihran*, quitting its former passage, took the course which it now takes. In the morning the people told *Dilu Rahi*, but all his efforts to repair the calamity were unavailing against the decree of fate. The ruin of Alor is dated to have commenced from that day. They say that *Seif-ul-Mulk* with his beloved *Budeh-ul-Jumal*, when they returned from the pilgrimage to the *Kaabah*, arrived and lived in the country between *Derah Ghazi Khan* and *Sitpur* and died. *Budeh-ul-Jumal* had two sons, *Jah* and *Chatah*; until now her tomb with those of her two sons, are places of pilgrimage.

*Account of the decline of the City of Bhunbur, generally known
as Brahmanabad.*

They relate, that Dilu Rahi after the ruin of the city of Alor came to the latter place to reside ; he had a brother *Choteh* Legend of the decline of Brahmanabad. *Oomrani* : in his youth he had been blessed with the true belief, so that leaving that city he had studied and learnt the Koran, and performed the duties enjoined by his religion sedulously. When he returned to the city, his relations pressed upon him the acceptance of the governorship, but he would not accept it : some one jokingly observed, “ This Turk has been to the Kaabah, and married the daughter of a certain Arab.” By chance in those his younger days he became anxious to perform the Haj ; and when he arrived there, he one day saw a woman in a shop occupied in repeating the Koran : he staid to listen. She asked him, why he staid ? He said, to hear the Koran. “ If you will teach me to read, I will be your slave.” The woman said, “ My instructor is the daughter of a certain person ; if you will disguise yourself as a woman and come with me, I will take you to her.” In short, in this way he was taken there, and became occupied in reading and meditating on the Koran. It appears, that his instructress was skilled in astrology : one day the woman came to her, and asked after the fortune of Choteh in disguise ; she said he would be a governor or chief. Choteh said, “ Since you know the fortune of others, can you tell any thing of your own ?” The girl said, “ You are right ; I shall wed with some one who is an inhabitant of Sindh.” They asked her, who it was ? she said to Choteh, “ You are the man.” In short, concealment was at an end ; the girl instructed him after this to go and change his garments, and to demand her in marriage as she was destined for him ; she then communicated the case to her parents, and was shortly afterwards married to *Choteh*. He after a time returned to his own country, and took his wife, whose name was *Fatimah*, with him : when he arrived at the city of *Dilu Rahi*, that tyrant had made a practice of seizing newly-married women, and then releasing them. *Choteh* tried to dissuade him from this, but he would not desist, until one day he heard the praises of *Fatimah*. Whilst *Choteh* was from home, *Dilu Rahi* came to see her. Choteh suspected his intentions ; coming quickly home, he took his wife and left the city, crying out, “ This city through the wickedness of its

governor will be swallowed up this night; whoever wishes to escape from destruction, has now the opportunity of doing so." Some few believed him. On the first night the city escaped, in consequence of the watchfulness of an old woman at her wheel; on the second, from the working of an oil mill: at length, on the third night, the whole city with its inhabitants was swallowed up and destroyed, and one minaret, as an example and to record the fact, yet remains.*

Account of the men of Sumrah taking possession of Cutch.

This tribe inhabited the country of Cutch, and the ruler of that province protected and encouraged them. After a

The Sumrahs take possession of Cutch: legend appertaining thereto.

time this tribe said, "We are strong and numerous, and we have lived safely under your shadow until we become troublesome: now give us a portion of waste land, so that we may cultivate it and pay tribute." The Rahi of Cutch with kindness gave them broad lands, and taxed them at 500 carts of grass from their crops. The tribe continued to pay the tax, and in a short time became acquainted with the manners and customs of the people and governors; they then determined amongst themselves to acquire possession of the country. Now at the gate of the fort occupied by the governor of Cutch, a brahmin and astrologer was placed, and he permitted all to pass in after he had inquired their business. This tribe had collected their 500 carts of grass, but in the grass of each cart they placed two armed men, and one drove the cart into the city; they say that when the carts came in, the brahmin said "there is the smell of flesh in these carts:" the door-keepers rejected his suspicions, and said, "What can there be in grass?" But some of those present thrust their spears into the grass. They say, that those in the carts wiped the blood of their bodies from the points of the spears, so that they should not be discovered. So the door-keepers accusing the brahmin of falsehood, allowed the carts to pass in, and thus the men took possession of the city, and overthrew the Rahi of Cutch, and became Chiefs of the country; until this time the descendants of the Sumrah are, in various

* *Brahmanabad* must have been situated in the *Lar*, or delta division of Sindh; its site is not fixed.

ranks, the governors of Cutch.* In short, when in consequence of *Dilu Rahis's* tyranny, the river *Mihran* flowed past *Sewistan*, and those lands which are now fertile became so ; then the land of the men of *Sumrah* became unproductive, and from inflicting brands and the op-

pressions of the before-mentioned tribe, complaints of the tribe of *Sumrahs*. were sent to the Sultan, *Hilaw-ul-din* at Delhi; he

sent his deputy and chief of his army *Sular Khan*, who coming upon the men of *Sumrah*, they sent their families in care of the tribe of *Charuns*, which tribe is highly respected by both parties, to *Abrah Abranee Sumah*, the governor of Cutch, and prepared to oppose the forces of the Sultan ; these latter came upon them like the storm on a vessel—there was a great battle. The son of *Sumrah*, who was the Chief of all the forces of that tribe, was killed ; the rest could not hold out in the city of *Joor* and fled to Cutch. The Sultan's troops pursued their wives and children to Cutch, and every night when they halted they threw a large ditch round the camp to prevent a night attack ; and these ditches are still to be seen, and very deep. When they reached Cutch, *Abrah Sumah* attacked the *Sumrahs* in conjunction with the Sultan's troops. In short, after the fall of the tribe of *Sumrah* the tribe of *Sumah* became

the possessors of those countries, and the city of *Mahamed Joor* was destroyed by the troops of the Shah ; and the city of *Samwa* was founded, and other new districts cultivated. The country of the city of *Joor*, which is situated near the purgunnah of *Darah*, being through ill fortune abandoned, they founded another *Jooreh* as shall be mentioned.

The Dynasty of the Jams of Sumah.

The origin of this tribe is traced to *Akrumeh Bin Hassan, Bin Abi-*

List of the Jams *Jihul* as has been mentioned ; but according to what has been related, at the time of the arrival of *Maham-*

Origin of the Sumrahs. *ed Bin Cassim*, this tribe had embraced *Islamism*, and the account of it is given by *Meer Massum* in the

"*Chach Nameh*." Thus, the descendants of *Akrumeh* about the year 93 H. the whole of this tribe entered the Mahomedan faith, and collected together from distant places in this country, and *Akrumeh* at or near

* The ruins of *Goomtee* in Cutch are in the traditions of that country, the scene of the exploit of the *Sumrahs*.

that time was a governor, and he is connected with *Sam Bin Oomur*, *Bin Hassan*, *Bin Abi Luhab*, but I do doubt if this is correct.

They are also said to be descended from *Jam-shid*; hence their title of "*Jam*," and this appears the most probable.

Reason of their taking the title of *Jam*, and their name *Sumah* or *Samah*.

From some great man it is related, that they are descendants of *Sam Bin Noh*, and thus they are styled *Sumah*. God knows.

1. *Jam Oonur Bin Babineh*. When they were released from oppression of the tribe of *Sumrah*, the men of *Sumah*, who before were cultivators of gardens, collected and styled him "*Jam*;" they constituted him chief and leader. It was thus in the year 752 H., and in a short time this *Jam* obtained complete power; *Mulk Ruttun* overthrew the remainder of the *Túrks*, who were governors in *Sewistan*, and after three years and six months, he died. They relate also, that *Kahah Bin Tamachi* his vakeel, brought *Ferroz* and *Alli Shah* from *Bakkur* to *Birkampur*, where they killed him; and after three days the men of *Oonur* killed *Mulk Ferroz*.

2. *Jam Junur Bin Babineh* succeeded his brother; he crossed over from *Tulhati*, and ravaged and pillaged the towns and villages; he left *Bukkur* in charge of the *Túrks*; after this he became powerful in *Sindh*, until Sultan *Hullaw-ul-din* sent his brother *Alif Khan* to *Multan* and its dependencies; *Mulk Taj Kuffuri* and *Tatar Khan* were sent to *Sindh* to oppose *Jam Junur*; previous to that *Jam Junur* had died: his reign extended for 13 or 14 years. The Shah's army took *Bukkur*, and looked towards *Sehwan*. After *Jam Junur*,

3. *Jam Tamachi Bin Jam Oonur* succeeded to the seat of government; the Sultan's army took him and his family prisoners to *Delhi*. The tribe of *Sumah* went to *Thurri*, and for 15 years, 4. *Jam Babineh Bin Jam Oonur* ruled over them, according to the account of *Meer Massum*. 5. *Jam Kheir-ul-din*, son of *Tamachi*, after the death of his father (according to the order of the Shah) came from *Delhi* to *Sindh*, and took possession. Sultan *Mahamed Shah*, pursuing *Taghi Ghullam* as before mentioned, arrived in the vicinity of *Tattah* and died, and Sultan *Ferroz* succeeded him. He went to *Delhi*; *Jam Kheir-ul-din* pursued him to the territories of *Sin*; after some engagements returned, ruled his subjects justly, and in peace. After *Kheir-ul-din*, his son, 6. *Jam Babineh* second, suc-

6. Jam Babineh the second. ceeded him; Sultan *Ferros Shah* came over, but returned, and coming again took him prisoner. After a time when he had experienced his services he conferred the government of Sindh upon him, and he ruled for 15 years and died : he founded the city of Samwi ; some say it was founded by *Payeh Bin Oomur*, but this is wrong.
7. Jam Tamachi the second. 7. *Jam Tamachi* second, his brother, succeeded, and ruled peaceably for 13 years : then his son,
8. Jam Sullah-ul-din. 8. *Jam Sullah-ul-din*, who after settling his own country proceeded to *Cutch*, and returned victorious : after 11 years he died.

In the praise of *Sheikh Himar Jumali* (may God's mercy be towards him) it is written, that *Jam Junur* sent *Jam Tamachi* and his son *Jam Sullah-ul-din* to Delhi, and they being released by the Sheikh above-mentioned from Hind returned to Sindh, and overthrew *Junur*, taking possession of the country ; first the father, and then the son ruled : but this differs with the first account of *Meer Mussum*. But God knows.

9. Jam Nizam-ul-din. In short, after *Sullah-ul-din*, *Jam Nizam-ul-din* succeeded to the government, and released his uncles.

The Editors at first hesitated to publish this article, fearing that their readers might consider it almost a reprint, or an amplification of the former paper by the same author, " On the early history of Scinde from the ' Chuch Namah,' &c.," as it in fact at first sight appears to be. But Lieut. Postans himself in his introduction has, they conceive, assigned the best reason why it should not, even at the risk of some repetition, remain unpublished, namely, that " the author of the *Toofut ul Kiram* has collected his materials from the best authorities." And this is of more importance than it at first sight appears to be, for it implies that the author, who like our own early chroniclers was living in part of the times of his own history, was like them also near enough to the epochs embraced in it to exercise his discretion in the choice of the matters to be chronicled ; and this doubtless founded on research amongst documents, and histories, and men now long passed away and numbered with

the dead. And the known customs of the Oriental writers of history, of publishing their works only after reading them to circles of the learned, would have furnished him with many facts, illustrations and corrections, which oral tradition had brought down, and which the stores of written knowledge then undoubtedly existing at all the courts of the Kalifat probably contained.

Our readers will thus, we hope, agree with them in their judgment that, as an historical reference, this translation is alike curious and useful, and they could not have given it otherwise than by printing it entire.

EDS.

Notices and Descriptions of various New or Little Known species of Birds, by ED. BLUTH, Curator of the Asiatic Society's Museum.

Nisoëtus alboniger, nobis. A smaller species than either of those of India, measuring about twenty-one inches and a half in length, wing thirteen inches, and tail nine and a half; tarse three inches: occipital crest three inches and a quarter. Adult black above, with a purple gloss, the large alars embrowned and distantly banded with black; tail black, with a broad light greyish-brown bar, occupying about its third quarter from the base; the longer upper tail-coverts have each two cross-bands of the same; lower parts pure white, with black mesial line on throat, large intense black *drops* on the breast, and the belly, vent, lower tail-coverts, tibial plumes, and short tarsal feathers, are throughout closely barred black and white: beak black; and toes wax-yellow. A younger specimen has the *drops* fewer and smaller on the breast, an admixture of rufous about the head, several unmoulted brown feathers among the wing-coverts, and one unmoulted tail-feather has three narrowish dark bars, with two more at base closer and less defined. A remarkably handsome species, from Malacca.

Of the four Indian species of this genus, *N. alboniger* approaches nearest to *N. cirratus*, (Ray, Shaw,) v. *Falco cristatellus*, Tem.; and I doubt whether either of these becomes wholly black with age, like

the *N. caligatus*, (? Raffles), v. *F. niveus* (!), Tem., v. *nipalensis*, Hodgson*, &c. a change, too, which would seem to obtain in the *Astur melanoleucos* figured in Dr. A. Smith's 'South African Zoology,' and which converts the *Archibuteo lagopus* into the *Falco Sancti Johannis* of the earlier systematists. A South African species of *Nisaetus* exists in the "*Aquila coronata*," also figured by Dr. A. Smith, in which, if that naturalist be correct, the progressive change of colouring is from light to dark; but his alleged adult is so like the young of the Indian *N. caligatus* in its first dress, that I suspect the changes will be found analogous in the two species. It may be further remarked that the *Aquila bellicosa*, (Daud.) A. Smith, v. *Falco armiger*, Shaw, pertains to a very distinct and long-winged form, exemplified also by the Indian *Aq. Bonellii*, v. *Nisaetus grandis* of Hodgson; and in this group, which may be distinguished by the name *Eutolmaetus*, the adults only exhibit white under parts: whilst in another aquiline form which may bear the name of *Butaetus*, exemplified by the *Falco pennatus*, Gm., v. *Spizaetus milvoides* of Jerdon, the reverse change of colouring obtains, as in the ordinary *Nisaeti*. Indeed, a further approximation to the latter group is shewn by an occasional distinct, though slight, enlargement and elongation of the central occipital feathers, in fine adult examples of *Butaetus pennatus*.

With respect to *Nisaetus cirratus*, which is evidently the "Crested Indian Falcon" of Willoughby, I described two specimens in a note to Vol. XII. p. 306; and those I must now consider to be young or imperfectly mature: for the Society has since received a much finer adult from Capt. Robt. Shortrede, shot at Midnapore, having a pendant occipital crest consisting of twelve elongated feathers, the four longest measuring five inches and a half. In other respects, this species is not very strongly characterized apart from *N. caligatus* (apud nos,) but has the belly, flanks, and upper tail-coverts, much darker than usual in the corresponding state of plumage of that species, the head also being darker, and the throat more streaky; the dorsal feathers, however, are decidedly of a different form, being

* Mr. Hodgson's crested variety of his *N. nipalensis* refers to *N. cirratus*, since called by him *N. pallidus*.—E. B.

much longer and narrower, instead of broad and rounded, a difference which is strongly marked on the lower interscapularies. Size the same. The splendid occipital crest is deep black, each feather tipped with white: upper parts empurpled hair-brown, the interscapularies, scapularies and tertiaries, more or less black, and the secondaries having distant dark bands; fore-neck and breast pure white, with a broad dark mesial streak to each feather; the belly, vent, flanks, and lower tail-coverts, dark brown; and thighs the same, a little freckled with whitish: tarsal feathers whitish, mottled with brown: head and neck fulvescent-brown, with mesial dark streaks; the usual three dark lines on the throat somewhat ill defined: tail as in *N. caligatus*, but less dashed with ashy.

This species seems to be peculiar to the hill districts of India, inhabiting alike the sub-Himalayan region, and the hilly parts of Central and Southern India. Mr. Elliot describes it to "sit on the tops of the highest trees, on the watch for hares, pea-fowl, and jungle-fowl, on which it swoops from its elevated perch. Solitary. Shot in the Rampoor jungle, inland from Nellore, at the foot of the Eastern Ghats." Mr. Jerdon and Lord Arthur Hay have since procured specimens from the same locality. The crest-feathers of this bird are not only longer and more copious than in either of the other species, but are of a more lax texture, so that when elevated they curve and droop backward, instead of remaining up straight. *N. caligatus* alone has invariably but a mere indication of this occipital crest, which is well developed in all the rest.

The other Indian species of *Nisaetus* are *N. pulcher*, *J. A. S.* xii, 305; and *N. Kienerii*, (de Sparre), v. *Spizaetus albogularis*, *J. A. S.* xi, 456.* The following description was taken from what I conceive to have been an adult male of the former, in fully mature plumage. Length of wing seventeen inches and a half, and of tail thirteen inches. Old crest-feather measuring four inches and three-quarters, and new ones growing, which would apparently have been considerably longer. Plumage very Hawk-like: upper parts hair-brown, the exposed terminal portion of the feathers darker and purple-glossed; wing-coverts banded with white; throat with the usual three *striae*, and the under parts light brown, transversely rayed with white, the colour darkening towards the white, and upon the tibial plumes. Received from Cherra-

* The latter has since been received from Darjeeling.

Poonjee; and forwarded by the late lamented Dr. Griffith to the Museum of the Honorable Company.

Of the *Spizæetus rufitinctus*, McClelland and Horsfield, *Proc. Zool. Soc.* 1839, p. 153, Mr. Strickland informs me, that "Dr. Horsfield now classes this as a *Limnaëtus*, and it seems only to differ in having the lower half of the tarsus bare and scutate. The beak has a lateral undulation. Wing ten inches and a quarter, and tail eight inches. Fourth and fifth quills equal and longest. The breast is barred brown and white, the bars and their intervals being each about a quarter of an inch wide, and on the thighs about an eighth of an inch wide. The feathers of the breast have two brown bars on each. Tail with four light and four darker brown bars." As this is one of the very few Indian *Raptore*s still wanting to the Society's museum, I shall also quote the original notice of it, as follows:—"Upper part of the body dark brown, with slight undulations of a deeper tint; breast and throat longitudinally striped with brown: belly and under surface of the wings white, transversely barred with brown: tarse feathered to the lower third, each feather marked with fine transverse bars; the rest shielded: the beak short, much hooked, and sharp: claws and toes strong and formidable.

"It inhabits the banks of the Boorampooter and other rivers in Assam, where it conceals itself in bushes and grass, along the verge of the water, seizing such fishes as approach the surface within its reach." This is also said to be the habit of the large naked-legged Owls which constitute the genus *Ketupa*.

Another species wanting to the Society's museum, and also distinguished by partially feathered tarse, may be described as

Buteo aquilinus, Hodgson. Length (of apparently a young female) about twenty-six inches, of which the tail measures eleven and a half; wing eighteen inches and a quarter; beak to forehead (in a straight line,) one and a half, and two inches and one-eighth to gape; tarse three and one-eighth, and plumed anteriorly for an inch and three-quarters. General colour hair-brown, the feathers edged with dull rufescent-brown, and their white bases shewing conspicuously about the nape; ear-coverts and sides of the head white, more or less dark-shafted; throat white, streaked with brown, the fore-neck coloured like the back, and the breast white for the greater portion of each

feather; the remaining terminal portion mingled pale and dark brown, being also dark-shafted; abdominal region and flanks, with the tibial plumes, dark brown, slightly rufous-edged towards the breast, and the axillaries more vividly rufescent; fore part of the under surface of the wing dusky-brown, the primaries freckled white beneath, except beyond their emargination where they become blackish; tail mottled with numerous dark bars, alternate on the two shafts of each feather, upon an albescent ground. Bill dark, as is apparently the cere: the toes appear to have been wax-yellow.

This bird might be mistaken, on a cursory view, for a variety of *B. canescens*, *J. A. S.* xii, 308, were it not for its half-feathered tarsi; and the beak also is larger and more aquiline, so that the name is felicitously bestowed. It is by no means a common species in Nepal, as I learned from Mr. Hodgson's people, and as might be inferred from the circumstance of Mr. Hodgson requiring the only specimen he had sent, to take with him to England. Not improbably it may prove identical with the *Falco asiaticus* of Latham, described as nearly similar to the European Buzzard in the colour of its body and wings, the under parts white with stripes on the breast, tail silver-grey, the outer feather marked by obscure bars; bill bluish-black, and legs yellow and *half feathered*. Length twenty-two inches. Inhabits China." From the circumstance of its partially feathered tarse, it might be presumed that the present species would fall under the division *Archibuteo* of Brehm, but the general character of the bird is not that of the 'Rough-legged Buzzard' of Northern regions.

B. pygmaeus, nobis. This is the smallest species of true Buzzard with which I am acquainted. Length eighteen inches, or perhaps rather more; of wing thirteen inches, and tail eight inches: bill to forehead (including cere) fifteen-sixteenths of an inch in a straight line, and an inch and a quarter from point of upper mandible to gape: tarse two inches, and feathered for nearly its upper third. Colour of the beak blackish, the cere and base of both mandibles appearing to have been yellow: legs and toes also yellowish, and talons black. General hue of the upper parts uniform hair-brown, the scapularies and coverts slightly tipped with rufous-white: nape white, tipped with brown, and slightly edged laterally with rufous, which colour increases on the sides of the neck and tinges the wings, the greater feathers

of which have their outer webs uniform brown, and the inner rufescent near the shaft and white towards the margin, being barred with the same brown as that colouring the outer web; the coverts are slightly edged and more largely tipped with dull rufous: the longer upper tail-coverts are tipped with whitish; and the tail is nearly of the same brown with the back, but rather paler and more greyish, its middle feathers having four broad dusky bars, the last subterminal, and a rudiment of a fifth which becomes gradually more obscure to the outermost: over and beyond the eye is a conspicuous whitish streak: the under parts are rufescent-whitish, palest on the throat and lower tail-coverts, which are without markings, excepting a slight dusky mesial line along the throat; the breast has a broad mesial dusky streak to each feather, assuming on the belly and flanks more or less the appearance of transverse bands, which are united along the shafts of the feathers leaving oval intervals of white, and the feathers being externally margined with pale fulvous: tibial plumes very pale buff, or with rufous central markings; and fore part of the under surface of the wings similarly coloured, the quills albescent underneath and obscurely barred, but dusky towards their tips. Inhabits the Tenasserim provinces, where procured by the late Dr. Helfer.

The other Indian species of true Buzzard are—*B. canescens*, Hodgson, upon the Himalaya, and spreading generally over the Upper Provinces—*B. longipes*, Jerdon, found chiefly to the west, but also in southern India—and *B. rufiventer*, Jerdon, peculiar (so far as known) to the south. Mr. G. R. Gray, in his catalogue of the *Raptores* in the British Museum, evidently mistakes *B. canescens* for *B. longipes*. From the description in the *Dict. Class.*, I suspect that the latter species is the *Circus pectoralis*, Vieillot, (placed, however, among the ‘*Buses*,’ or Buzzards, not among the ‘*Busards*,’ or Harriers,) in which case it must rank as *Buteo pectoralis*; but Mr. Jerdon, judging from another description of the latter, is of opinion that it cannot be identified with either of his species.

The *Circus teesa*, Franklin, v. *Astur hyder*, Sykes, assigned to *Buteo* by Gray and others, must now be referred to *Poliornis* of Kaup; *Bustur*, Hodgson, *J. A. S.* xii, 311, sinking to the rank of a synonym.

Hematornis, Vigors (nec Swainson); *Spilornis*, G. R. Gray. The distinctive characters of the species referred to this genus are at pre-

sent much in need of determination. Firstly, there is the *Bacha* of Levaillant, or *Falco bacha*, Lath., which is described to be of the size of the Common Buzzard of Europe; female larger: this does not occur near the Cape, but was obtained far inland towards the tropic. Next, *Falco bido*, Horsfield, from Java, subsequently considered as identical with the African species by Dr. Horsfield: Mr. Vigors, however, in *Proc. Zool. Soc.* 1831, p. 170, "expressed his doubts whether the *Falco bacha*, Lath., and *F. bido*, Horsfield, were the same species, although they were generally supposed to be identical. He had not the opportunity of examining a sufficient number of African specimens to determine the point." Three species, however, were distinguished by Mr. Vigors on that occasion, that of India being described by the name *Hæm. undulatus*: but this Indian bird had previously been designated *Falco cheela* by Latham and Gmelin, and the young was termed *F. albidus* by Cuvier; it has also since been named *Circæetus nipalensis* by Mr. Hodgson, and the young *Buteo melanotis* by Mr. Jerdon*. The distinctions of Mr. Vigors's three species "consist chiefly in size, the *Hæm. holospilus* (from the Philippines) being one-third smaller than *H. bacha*; while *H. undulatus* considerably exceeds the latter. The first is spotted all over the body, the second only on the abdomen; while the third is marked by spots on the wing-coverts, and by *ocelli* bearing an undulated appearance on the abdomen, the breast also being crossed by undulating *fasciæ*." These last are chiefly seen in the females.

In Mr. G. R. Gray's catalogue of the specimens of Raptorial birds in the British Museum, specimens from India and Java are referred to *Spilornis bacha*, and others from India to *Sp. undulata*. I doubt, however, altogether the existence of more than one species in India, of which I presume that the males have been referred by Mr. Gray to *H. bacha*, and the females to *H. undulatus*; this latter name must indeed be superseded by *cheela* of Latham. But a specimen from Malacca agrees with the description I have lately received of Dr. Horsfield's Javanese bird, and differs from every one of a very extensive series of the Indian bird now before me—1stly, in its inferior

* Latham's "Noble Eagle" would seem to be merely a fulvescent specimen of the young of this bird, such as are by no means uncommon.

size, the wing measuring but fourteen inches, and tail nine and a half*; 2ndly, in the absence of the distinct white spots on the small wing-coverts, the extreme bend of the wing only being thus marked, and slight traces of them alone shewing elsewhere; and 3rdly, there is some difference in the barring of the primaries underneath, the third primary, for instance, having its subterminal pale band much narrower and ill defined, instead of this being broad and well defined. I should like, however, to examine several Malayan specimens before coming to a final decision; although my impression certainly is that the Indian and Malayan species are distinct, and I shall provisionally regard them as such, terming the former *H. cheela*, (Lath.), and the latter *H. bido* (v. *bacha*?) At all events, I feel confident of their being only one species in India, and it is probable that there is one only in Western Malasia, but a third in the Philippines and China.

Urrua (Hodgson, founded on *Otus bengalensis*, Franklin, Gould,) *umbrata*, nobis. Length two feet or nearly so, of closed wing sixteen inches, and tail nine inches; bill from point to gape nearly two inches, and tarse scarcely more. General cast of colour deep freckled umbre brown, unrelieved by fulvous; the outer scapularies having the usual dull white oval spots on their exterior webs: wings dashed with cinereous: tail crossed with three dark bands, and an indistinct fourth at base: and the under parts pale, with a narrow dark brown mesial streak on each feather; bill light yellow; and talons pale. Aigrettes blackish-brown. The feathers of the crown and nape are dingy grey at base, with their surface portion freckled, and a narrow mesial dusky line on each: those of the back and the scapularies have this central dark streak much broader. This fine Owl is common in Lower Bengal, was forwarded from Nepal by Mr. Hodgson, and has been obtained by Mr. Jerdon in the Indian Peninsula. It is clearly that alluded to by Latham in his description of *U. (?) coromanda*, as represented in a drawing twenty inches long; and it is the *Urrua coromanda* apud Hodgson, as noticed by him in *J. A. S.* vi. 373, having been forwarded by him under this name to the Society's museum.

* In the India-house specimen, from Java, Mr. Strickland informs me that the wing measures fifteen inches and three-quarters, and the tail ten inches; which size corresponds with that of the very smallest Indian specimens.

“ *Le petit Hibou de la côte de Coromandel*,” as described by Sonnerat, and upon which is founded *Strix coromanda*, Lath., and *Str. coromandelica*, Forster, does not appear to have been since verified; and the published drawing of an Owl, referred to this, in Hardwicke’s ‘Illustrations of Indian Zoology,’ represents a species unknown both to Mr. Jerdon and myself. It is not improbably a large *Scops*: this being a genus particularly rich in Indian and Malayan species, some of which are as yet not quite satisfactorily understood. Mr. Jerdon especially has made great efforts to elucidate them; and the following is about our present state of information respecting the group.

1. *Sc. rufescens*, (Horsfield), *Lin. Tr.* xiii. 140. This species has been determined with the assistance of Hugh E. Strickland, Esq., who has kindly examined the original specimens of the birds described in Dr. Horsfield’s Javanese list, and has favored me with more minute notices of some of them, and identifications of others with species previously described. Elsewise, as Dr. Horsfield had given the entire length as eight inches only, I had some hesitation in agreeing with Mr. Jerdon in referring a Malacca specimen in the collection of Lord Arthur Hay, to the present species; but the difficulty is now removed by my friend Mr. Strickland, and I have the pleasure of giving the following description from Lord A. Hay’s specimen. Length about eleven inches, of which the tail measures four inches and three-quarters; wing six and three-quarters; tarse an inch and a quarter. General colour ferruginous-brown, much paler below; the forehead, lower part of disk and aigrettes in part, conspicuously white, with a few minute dark speckles: upper parts marked with whitish spots along the shaft of each feather; the lower variegated with dusky and whitish in cross-striæ: primaries and tail with numerous broad dusky bars, amounting to about twelve in number on the latter: tarsal feathers not continued over the joint at the base of the toes. A strongly marked species, apparently peculiar to the Malay countries.

The next in point of size is

2. *Sc. lettia*, Hodgson, *As. Res.* xix, 176: probably *Sc. lempiji* apud Horsfield, from Assam, *Proc. Zool. Soc.* 1839, p. 155. This is the largest of three closely allied species, the distinctions of which were first observed by Mr. Jerdon. Its wing measures from six inches to six and a half, apparently according to sex; and the young have a

more ferruginous shade of general colouring than the adults. In a living specimen which I saw, the most remarkable feature (for an Owl of this genus) was its very dark irides, appearing black : and Mr. Hodgson, in his description of the species, remarks, "Iris variable, yellow in the young, brown in the old birds". It inhabits the sub-Himalayan ranges, extending to those of Sylhet and Arracan, and doubtless to all those of Assam.

3. *Sc. lettoides*, Jerdon, *MS.* Differs from the last in its constantly smaller size, and more ashy colouring ; the short tarsal plumes appear to be always white, with at most obscure traces of mottling. From the next it also differs in its predominant ashy tinge. Length of wing five inches and a quarter to five and three-quarters. Peculiar to the Coromandel coast, and it would seem there generally common.

4. *Sc. lempiji*, (Horsfield) : *Strix noctula*, Reinwardt ; *Scops javanicus*, Lesson. Specimens which (from Mr. Strickland's description of Dr. Horsfield's Javanese bird,) I refer to this, from the vicinity of the Straits, are often deeply imbued with ferruginous-brown throughout : some of these being evidently in nestling dress, from the flimsy texture of the feathers ; and the others are perhaps in second plumage. Others, again, have merely a weak shade of ferruginous-brown like the young of *Sc. lettia* ; and the mottling of the upper parts is coarser and more blotched. The latter are perhaps distinct ; for while the former seem to be peculiar to the Malay countries, these occur not only in Malasia, but along the Malabar range, and in China. The Society possess a specimen from Macao. Future observation must determine whether the ferruginous-brown birds are so spread ; and specimens should be sought for that might exhibit a transitional moult.

5. *Sc. sunia*, Hodgson, *As. Res.* xix. 174. This beautiful species appears to be generally diffused over the country, though, it would seem, rather sparingly. Mr. Jerdon has obtained specimens near Nellore, and I have twice met with it in Lower Bengal. A very handsome adult female, shot near Calcutta, has the whole upper parts uniform bright chesnut-ferruginous, with inconspicuous black shafts to the dorsal plumage, tending to become obsolete, and more distinct black shafts to the frontal feathers, the aigrettes, and the fore-part of the wings ; exterior line of scapularies albescent, with conspicuous black tips ; and there are smaller black tips to the plumelets which

compose the disk : under parts deeply tinged with the hue of the back, but an admixture of pure white on the belly and under tail-coverts ; and the breast and sides of the belly have some tolerably broad black central streaks to the feathers, those of the latter being also variegated with transverse pencillings : the unspread tail has its bands obsolete ; and the bars on the outer webs of the primaries are indistinct. A male and female, apparently in second plumage, which I procured alive, have the ferruginous colour of the upper-parts somewhat deeper, though less bright, with the black centres to the feathers much more developed, and these are copiously variegated with cross-pencillings everywhere but on the forehead, crown, and the aigrettes ; the under parts have also a much greater admixture of white, and the black streaks and pencillings are considerably more developed ; primaries and tail conspicuously banded. The colouring of the nestling plumage would, however, seem to approximate more to that of the adult (and this, accordingly, may be likewise the case in *Sc. lempiji*) : it is distinguished by the usual weak and unsubstantial texture of the clothing feathers, and by the narrower and more pointed form of the wing-primaries.

6. *S. pennata*, Hodgson, mentioned in *J. A. S.* vi, 369, and recognised in Mr. G. R. Gray's list as distinct from the European *Sc. zorca*, to which it is nearly allied * : *Strix bakamoëna*, (?) Pen., and *indica* (?), Gmelin, founded on a rude drawing of a Cingalese specimen, no doubt inaccurate as regards the "scarlet" colour of the irides, the exceedingly small size given as that of nature (about four inches long), and also the excessively contrasted barring of the primaries ; likewise in the lower portion of the tarsi being represented as bare. The present species is smaller than any of the foregoing, its wing measuring from four inches and five-eighths to five and a quarter long ; and it so nearly resembles *Sc. sunia* in its general characters, that I formerly suspected it would prove but a grey variety of that bird : its under-parts are marked very like those of *Sc. sunia*, and there is a certain admixture of ferruginous especially about the breast, and a decided tinge of the same chiefly upon the large alars and their coverts, and seen elsewhere more or less upon the upper parts,

* A specimen of *Sc. zorca* is there noted from China ; and this species has long been stated to occur in Northern Asia ; at least the *Strix pulchella*, Lin., of Russia and Siberia, has been currently identified with it.

as particularly about the aigrettes, that is very apt to induce a suspicion of its identity with *Sc. sunia*. From the other grey species, it is generally distinguished by the delicacy of its pencillings, and by those of the crown scarcely, if at all, differing from the markings of the back, instead of blending into a large black mass: but without a series of the *Sc. zorca* for comparison, it is quite useless to attempt giving a satisfactory minute description of this Indian bird, which is an inhabitant alike of the Himalaya and Southern India. A Malacca specimen in Lord A. Hay's collection also approaches very nearly both to this little Indian *Scops* and to *Sc. zorca*, of which latter I had a specimen on loan when I took the following brief description of his lordship's bird: "Darker-coloured and more uniformly pencilled (i. e. less variegated) above, than either *Sc. zorca* or *Sc. pennata*; and the tail marked with four or five distantly placed, and well defined, narrowish chesnut bands. Probably a distinct species." In the specimens of *Sc. pennata* before me, the tail-markings are comparatively ill defined, but consist of pale chesnut bands, margined with dusky, and the intervening spaces dotted with the same.

A *Sc. gymnopus*, from India, is mentioned in Mr. Gray's catalogue, but which does not appear to have been yet described: and the same gentleman gives two new species from the Philippine Islands, *Sc. philippinensis* and *Sc. megalotis*.

The genus *Athene* is scarcely less developed in this part of the world. In India, we have

1. *Ath. cuculoides*, (Vigors). Common in the Himalaya, in the hill ranges of Assam, Sylhet, Arracan, and the Tenasserim provinces, and extending eastward to Chusan: but unknown in the ranges of peninsular India.
2. *Ath. Brodiei*, (Burton): *Noctua tubiger*, Hodgson; *Strix passerina* (?), mentioned in Royle's list. Himalaya.
3. *Ath. radiatus*, (Tickell): *Ath. erythropterus*, Gould; *Noctua perlineata*, Hodgson; *N. cuculoides* apud Jerdon, *Catal.* Himalaya, and the ranges of Central India.
4. *Ath. castanopterus*, (? Horsfield): *Strix spadicea*, (? Reinwardt). Malabar range, and the upland districts of Ceylon. This species differs from the last in its more rufous general colouring, especially on the whole wing, the basal portion of the primaries (except the three first)

being spotless deep rufous. A Cingalese example, procured by H. R. H. Prince Waldemar of Prussia, had the entire back and wings deep rufous-bay; while the pale bars on the head were only a little more rufescent than in *Ath. radiatus*. *Ath. castanopterus*, from India as well as Java, is mentioned in Mr. Gray's list of British Museum *Raptores*; and it is also stated to occur in the Tenasserim Provinces.

5. *Ath. Sonnerati*, (Tem.) *Non. vidi**.

6. *Ath. brama*, (Tem.): *Noctua indica*, Franklin; *N. tarayensis*, Hodgson; *Strix persica*, (?), *Nouv. Dict. d'Hist. Nat*, vii, 26.† Very common in Lower Bengal, and in India generally.

A *Noctua auribarbis* is mentioned by Mr. Hodgson, *J. A. S.* vi., 369; and an *Ath. badia*, Hodgson, in Mr. G. R. Gray's list of the Raptorial birds in the British Museum. These remain to be described.

Syrnium niviculum, Hodgson, *n. s.* This so nearly resembles certain non-rufous specimens which I have seen of the European *S. aluco*, that I even suspected the identity of the Himalayan and the British birds, until a second specimen (presented to the Society by Mr. Jerdon) repeating the characters of the one which Mr. Hodgson took with him to England, inclines me now to the opinion that they are distinct; the present being also decidedly a larger bird. The length of Mr. Hodgson's specimen was about seventeen inches, of wing eleven and a half, and tail seven and a quarter; tarse two inches: and I took the following brief description of it. "Colour of the upper parts mingled brown and blackish; rather minutely mottled, producing a dark brown *ensemble*; head and neck tawny or fulvous-brown, with dark mottling at tips of feathers; a streak above each eye, ascending from the facial disk, and the mesial part of the crown, between these streaks, blackish. Under parts bright tawney-brown, mingled with dark brown and whitish: feathered tarsi and toes fulves-

* "Inhabits India. Length eleven inches; all the upper-parts of the body are reddish-brown, the head being adorned with small white spots, and the wing-coverts with large spots of the same: the quills and tail-feathers are like the back; the space round the eyes is reddish-white, as well as the face and throat: all the under-parts are white, transversely but distantly barred with brown: the down on the tarsi and toes is red: the beak and claws are yellow."—*Stephens*.

† *Ath. brama* is common about the foot of the mountains near the town of Erzeroum. *Proc. Zool. Soc.* 1839, p. 119.

cent, with deeper tawney spots; alars and tail banded, the latter with mottled light brown upon a dark ground." The second specimen (also Himalayan) has the wing twelve inches and a quarter long, and the tail seven and a half. It agrees generally with the foregoing description, but has less of the fulvous tinge, and is, I think, more obviously distinct from *S. aluco*. The minute mottling of the plumage is difficult to express in words: but the feathers of the under parts may be described as whitish, partially tinged with fulvescent, and having a dusky central streak, broader towards the tip of the feather, and three or four narrower transverse streaks of the same; and the like may be described as the basis of the markings of those above, modified so that the pale portion appears, more or less, as a series of pale spots on the two webs of each feather;—the well developed transverse markings of the feathers constituting a good distinction of this bird from the European *S. aluco*, independently of its deficiency of rufous colouring. The form is perfectly true to the generic type of *S. aluco*.

Of the species of *Strix*, as now limited, three pertain to the *Fauna Indica*.

1. *Str. javanica*, Gm., de Wurmb, apud Latham: *Str. candida*, Tickell, *J. A. S.* II. 572; *Str. longimembris*, Jerdon. Buchanan figured it; but Latham is wrong in stating that the claw of its middle toe is not serrated; and it has also four well defined blackish bars on the tail. Found chiefly in peninsular India. Whether it be truly de Wurmb's Javanese species, I have no immediate means of ascertaining*.

2. *Str. flammea*, Lin.: *Str. javanica*, apud Horsfield (?), Sykes, and Jerdon. Very common, and differing in no respect from the British bird.

3. *Str. badia*, Horsfield. Mr. Hodgson obtained a single mutilated specimen of this bird in Nepal; and the Society has been favored with a very fine one by Captain Abbott, shot in the island of Ramree, Arracan. About Malacca and Singapore, it would seem to be not uncommon.

* "Horsfield's *Strix javanica*," writes Mr. Strickland, "has the tarsi five-eighths of an inch longer than in a British *Str. flammea*. It comes near *longimembris*, Jerdon, but is mottled grey above, instead of blotched with brown." Dr. A. Smith has figured a species from South Africa, allied to true *javanica* (? v. *longimembris*), by the name *M. capensis*.

We will now leave the *Raptores*, and commence the varied tribes of Perchers with a new Hornbill :

Buceros carinatus, nobis. Length about thirty-two inches, of wing thirteen and a quarter, and tail a foot, its outermost feathers an inch shorter than the middle ones: bill to eye five inches, the casque little elevated, at most about three-quarters of an inch, and the depth of bill and casque together two inches and a quarter. Form of the casque truly carinate, like the keel of a boat, rising with a curve from the forehead, extending for two-thirds of the length of the upper mandible, and its anterior portion sloped forward: a lateral ridge exterior to the nostrils causes these to open upwards. In one specimen before me, (which I suspect is an old female,) the bill and casque are wholly black; but in another, with the latter somewhat less developed, (probably an adolescent male,) the bill is yellowish-white, except the basal two-thirds of the lower mandible, and the extreme base of the upper, continued along the tomæ for half its length, and along the upper portion of the casque to near its extremity. In the former specimen, the medial portion of the belly, the vent, and the lower tail-coverts, are dark brownish-albescent; while in the latter this is confined to the vent and lower tail-coverts: but there is no other difference of plumage. The throat is naked, as likewise a large space surrounding the eyes. Occiput adorned with a large full crest of lengthened feathers, rounded at the tips, and measuring two inches and three-quarters long, or rather less in the black-billed specimen (or old female?). General colour black, with green and purple glosses, the edges of the secondaries and tertiaries, and of the lengthened occipital feathers (more or less), whitish-brown—much as in *B. gingalensis*, to which the present species is certainly allied: terminal four and a half to five inches of the tail deep black, the rest brownish-ashy, darkest at base, and paling to its junction with the black. In both specimens the edges of the mandibles retain their original serration, more or less perfectly, which is seldom seen in adult Hornbills. Procured at Malacca by the Rev. F. W. Lindstedt, to whom the Society is indebted for a large and valuable collection of the mammalia and birds of that particularly rich, but little explored, locality.

The *B. comatus*, Raffles, *Lin. Tr.* xiii, 339, would seem to be allied to the above in form of bill, but is evidently distinct. *B. malayanus*, Raffles, *ibid.* p. 292, would seem to approximate the adolescent *B.*

bicolor, Eyton, except that it has "a white stripe extending from behind each eye to the back of the neck, and so encircling the head." *B. bicolor* is probably the *B. malabaricus* apud Raffles, and *B. albirostris* apud Horsfield; and with reference to my description of this species in *J. A. S.* xii, 996, I may mention that the casque does project forward, and very prominently, in old specimens. Of the other species noticed on the same occasion, I have been since informed that *B. cristatus*, Vieillot (p. 988,) has been renamed *B. buccinator* by Mr. Gray; *B. pucoran* (p. 990, as Swainson misled me in spelling it,) should have been written *B. pusaran*, it being rightly identified with the bird of Raffles; *B. malabaricus* (p. 993,) must rank as *B. pica*, Scopoli; and *B. ginginianus* (p. 996,) as *B. birostris*, Scopoli, the names given by this author holding priority over those of Latham and Gmelin. Lastly, with respect to Raffles's assertion that the females of *B. rhinoceros* are rather smaller, and have the horn more recurved than in the male, it shews that that respected observer was unacquainted with the perfectly matured male, which not only is larger than the female, but has the tip of its casque reflected so as to point downward, whereas in the female (so far as I have observed) it rarely, if ever, even points backward: the sexes in this species being readily distinguishable, like those of *B. cavatus*, *B. pica*, and other allied species, by the *posterior* surface of the horn, above the forehead, being black in the male, and concolorous with the rest in the female; besides which the male Rhinoceros Hornbill has a black line dividing the bill and casque, and continued forward and upward upon the latter, parallel with its anterior margin. It may be remarked further, of the Rhinoceros Hornbill, that this species seems to wear away the cutting edges of its mandibles more than any other; so that when the tips meet, a wide hollow occurs along the medial portion of its bill.

Genus *Irrisor*, Lesson. In the 'Annals and Magazine of Natural History' for 1843, pp. 238 *et seq.*, is inserted a paper read by Mr. Strickland to the Zoological Section of the British Association Meeting of that year, wherein is argued the near affinity of this well marked genus for the Hoopoes (*Upupa*), in opposition to the opinion of the Baron De la Fresnaye and others, who have contended that these two genera are, at most, but very distantly allied: and though Mr. Strickland has hazarded no decided opinion respecting the immediate affinities of the combined group formed of *Irrisor* and *Upupa*,

which group he styles *Upupidæ*, and regards its two generic sections to be of the value of subfamilies, adding the remark, that the question where the *Upupidæ* should be placed cannot, as he thinks, "be answered satisfactorily till more facts are collected respecting the food, habits, and anatomy of this group and of others with which it may be compared," I may here notice that while I quite agree with Mr. Strickland in approximating the two genera under consideration, I still retain my conviction expressed several years ago (vide *Mag. Nat. Hist.*, n. s., 1838, p. 593), and formed upon anatomical data, that the Hoopoes are nearly related to the Hornbills; and the hiatus between these two allied, but distinct, groups is considerably lessened by the interposition of *Irrisor*, which genus I suspect is subordinate to *Bucerotidæ* rather than to *Upupidæ*, and as a subfamily of the former, I conceive it to be most naturally placed. In the configuration of the sternal apparatus, the chief differences occur in the anatomy of the Hornbills and the Hoopoes, the alimentary organs presenting a very close similitude; and in the form of the sternum and its appurtenances, I will venture to hazard the conjecture that proof will be afforded of the near affinity of *Irrisor* for *Buceros*. As in both *Buceros* and *Upupa*, I observe that *Irrisor* has only ten tail-feathers, whereas the allied genera of *Halcyonidæ*, &c. have twelve; and perhaps we should not be wrong in arranging both *Irrisorinæ* and *Upupinæ* as subfamilies of *Bucerotidæ*.

Hoopoes (*Upupa*, Lin.) There are three distinct, although closely allied, species of this genus, as follow :

1. *U. epops*, Lin. The common European Hoopoe, which is numerous in Bengal, and in Upper India generally, but of rare occurrence in the south of India. Mr. Jerdon has obtained it in the Neilgherries. Length of its wing six inches.

2. *U. senegalensis* (?), Swainson, 'Birds of W. Africa,' ii, 114, *Nat. Libr.* : *U. minor*, apud Jerdon. This quite agrees with Mr. Swainson's description of the Senegal Hoopoe, except that some specimens have a trace of whitish on the hinder crest-feathers, where indeed it chiefly appears in *U. epops*. The wing varies from four inches and three-quarters to five and three-eighths in length; but the bill is as much elongated as in the last. Common in most, if not all, parts of the peninsula of India.

3. *U. minor*, Shaw. Distinguished from both the preceding by having the primaries plain black. without the broad white band con-

stant in the two others; and also by having the white caudal bar placed much nearer the base of the tail. The colour, too, especially of the crest, is more rufous, and there is no intervening white or whitish between the rufous portion of the crest-feathers and their black tips. Length of the wing five inches and a quarter. It has only been met with in South Africa.

Specimens of each are in the Society's Museum.

Alcedo grandis, nobis, n. s. Resembles *A. ispida* and *A. bengalensis*, but is distinguished by its much larger size. Length of wing three inches and three-quarters, of tail two inches, and of bill to forehead two inches and one-eighth. From Darjeeling. It may be remarked that several specimens of *A. bengalensis* occurred in the same collection with *A. grandis*, which I mention with a view to refute the opinion entertained by some theorists, that the disparity of size between either of these species and *A. ispida* is due to the influence of climate and other local causes.

Halcyon capensis, (L.) Specimens of this bird (if absolutely the same,) from the vicinity of the Straits, differ from those of India in being much more intensely-coloured, both above and below; the ferruginous of the under-parts, which is very deep in apparently the males, suffusing the nuchal collar and throat, which latter does not tend to be albescent, and there is a considerable bluish-green gloss upon the brown cap, never seen in Indian specimens, and reminding one of the cap of *Todiramphus collaris*, (Scopoli and Swainson, v. *chlorocephalus* of Gmelin.) In fact, there seems as good reason for distinguishing these Indian and Malayan birds as species, as exists in the instance of *Cergle rudis* of Africa, and *C. varia*, Strickland, of Asia; and another example of a Malayan bird which greatly exceeds its Indian representative in intensity of colouring, occurs in the common Jungle-cock of the two regions, alike referred to *Gallus bankivas*, Tem.

Coracias affinis, McClelland and Horsfield, *Proc. Zool. Soc.* 1839, p. 164. The numerous specimens of Rollers from Assam, Arracan, and Tenasserim, which I have seen, all pertain strictly to this species; having the upper parts greener than in *C. indica*, the neck and breast devoid of the reddish-brown colour proper to the latter species, being purplish-dusky varied with bright purple on the fore-neck, and the entire under surface of the wing, except near the tips of the primaries, is deep purple: but I have obtained several specimens in the vicinity of Calcutta, and some from Tipperah, which present every gradation of plu-

mage from one to the other of these species, and also one or two in the pure *affinis* plumage; from which I infer that where found together in the same locality, they not unfrequently interbreed, and tend to merge into a single blended race. It may be further remarked that I have never seen an example of true *C. affinis* with the broad terminal purple band to the tail, which distinguishes the adult *C. indica*; but I have seen this imperfectly developed in the mixed race, which latter has also commonly the fore-part of the under surface of the wing intermingled purple and verditer. On the western side of India, the *C. garrula* was obtained, together with *C. indica*, by Sir A. Burnes in the Moultan; and both this and *Merops apiaster* are common in Afghanistan. Whether the *C. indica* and *C. garrula* likewise intermix, remains to be ascertained.*

Woodpeckers. Of the species of this group noticed in *J. A. S. XII*, 998 *et seq.*, I have now to remark, that *P. (Gecinus) viridanus* would seem to be the *P. dimidiatus* of the *Dict. Class.*, though not of Hardwicke and Gray; *P. occipitalis*, Vigors, should be termed *barbats*, Gray (if it be not *affinis* of Raffles), as there was previously a *P. occipitalis*, Valenciennes; *P. nipalensis*, Gray, may, I think, be safely referred to *P. chloropus*, Vieillot, as I before suggested†; *P. (Chrysocolaptes) melanotus*, nobis (p. 1005, and XIII, 394,) v. *P. Elliotti*, Jerdon, is decidedly the *P. goënsis*, Gm., founded on the *Pic vert de Goa* of Daubenton; and *P. (Chr.) strictus* of Horsfield, v. *sultaneus*, Hodgson, v. *strenuus*, Gould (noticed in *Proc. Zool. Soc.* 1839, p. 165, and also in Dr. Royle's list of birds from the neighbourhood of Saharunpore, though never, I believe, described by this name), which has been commonly referred to *P. goënsis*, must retain the name *strictus*, Horsf.: lastly, having obtained a Malacca specimen of *Microcolaptes abnormis*, Tem. (p. 1005), I am enabled to confirm my former suspicion of the near affinity of *Sasia ochracea*, Hodgson, which, though distinct as a species, is most closely allied to *M. abnormis*. *M. ochraceus* is common in the hill ranges of Assam, Sylhet, and Arracan, being generally seen hopping from twig to twig of bushes or low branches of trees, though occasionally climbing like an ordinary Woodpecker.

* Two specimens just received from Gow-hatti (Assam) were both pure *C. affinis*; while three others from the neighbouring district of Rungpore were unmixed *C. indica*.

† This bird makes a near approach in structure to *P. (Dendrobates) immaculatus*, Sw. (received from the Cape): accordingly, it would appear that *Dendrobates*. is scarcely, if at all, separable from *Gecinus*.

Picus (Gecinus) malaccensis, Lath., founded on *le Pic de Malacca* of Sonnerat, may be described anew with advantage from specimens presented to the Society from Malacca. It is allied in size and form to *P. chloropus* (v. *nipalensis*), and in plumage also to the species of *Brachylophus*, but differs very decidedly from the latter in the shape of its bill, which is larger and more that of a typical *Gecinus* than the *Dendrobates*-like beak of *P. chloropus*: it has also the yellow nuchal crest less developed than in the latter, and resembling that of *Brachylophus puniceus*. General colour dingy green, brightest on the back, where more or less tinged with yellow, especially on the rump; beneath inclining to dusky, barred with dull white on the flanks, but the latter less predominating than in *P. chloropus*: wings crimson, with dusky primaries, and green tips to the longest tertiaries: tail black. The male has the whole top of the head, lengthened occipital feathers, and moustaches, crimson; while the female has the coronal feathers green, tipped only with crimson, and merely the long occipital feathers as in the male, below which those of the nape are yellow in both sexes. Bill dusky above, the lower mandible yellow; and feet have apparently been green. Length ten inches, or nearly so; of wing four and three-quarters to five inches; and tail three and a half to three and three-quarters; bill to forehead an inch and a quarter. From Malacca.

Subg. *Gecinulus*, nobis. This is a third form of three-toed Woodpecker (in addition to *Picoides*, Lacep., of northern climates, and *Tiga*, Kaup, v. *Chrysonotus*, Sw., of south-eastern Asia and its islands), most nearly allied to *Gecinus*, from which it differs in the shortness and lateral compression of its beak, and the small size of the feet, which have besides no inner fourth toe. As a peculiar form of Woodpecker, it is very distinct, though represented only (so far as I am at present aware,) by

P. (Gec.) Grantia,* McClelland and Horsfield, *P. Z. S.* 1839, p. 165. Length nine inches and a half, or ten inches; of wing five inches; and tail three and three-quarters: bill to frontal bone an inch and one-eighth; and spread of foot an inch and three-quarters. Colour somewhat brownish red above, the secondaries and tertiaries having three light red bars, and the greenish-dusky primaries four or five yellowish ones: tail similarly banded; breast and under parts dusky-

* Quære, *Grantii*, or *Granti*?

green; head and neck light yellowish-green, paler and browner towards the beak, and the crown of the male only, dull crimson. Bill white, with some dusky at the base of both mandibles; and feet apparently dark slaty. Hab. Darjeeling, and the mountain ranges of Assam.

Of the subgenus *Tiga*, Kaup, three allied species exist, which have never been yet properly distinguished.

1. *P. (T.) Shorei*, Vigers, *P. Z. S.* 1831, p. 175; Gould's 'Century,' pl. XLIX. Distinguished by its superior size, the wing measuring six inches long; by the crimson of the rump spreading over, or rather tinging, more usually the entire back (more or less); and by the elongated pale central streaks of the coronal and occipital feathers of the female, these streaks being continued nearly throughout the feather, and anteriorly often spreading over the whole feather, so that the forehead becomes almost plain light brown. In one female before me, there are also some intermixed crimson feathers on the occiput, which I have never seen in either of the other species: but whether these are of constant occurrence I do not know, and another female in the Society's museum is unfortunately deficient of feathers just at this part. Inhabits the sub-Himalayan region, as well as the hill ranges of peninsular India; but I have never seen it from the eastward of the Bay of Bengal.

2. *P. (T.) intermedius*, nobis. Exactly midway between the two others; the whitish on the coronal feathers of the female forming very elongated spots, rather than central streaks; and the back above the rump not usually suffused with crimson. Wing five inches and a half to five and three-quarters long. Common in Nepal, Assam, Sylhet, Tipperah, Arracan, and Tenasserim; and the only kind which I have seen from those parts, Nepal excepted.

3. *P. (T.) tridactyla*, (Sw.) Strickland; *Picus tiga*, Horsfield. Wing but four inches and seven-eighths, to five inches and one-eighth, long: and the whitish spots on the head of the female very much contracted, tending indeed to become obsolete, and their form a lengthened oval, narrow and minute. The bill to gape in *P. Shorei* measures an inch and three-quarters, in *P. intermedius* one and a half, and in *P. tridactyla* one and a quarter; in a young female of *P. tridactyla* before me, scarcely one and one-eighth. The specimens described are from Malacca, and are of the only size that I have hitherto seen from the Malay countries. Dr. Horsfield, however, gives the length of his *P. tiga* as eight inches and a half; whereas Raffles

assigns "above ten inches," and may therefore allude to *P. intermedius*. From peninsular India, I have as yet only seen *P. Shorei*: but Mr. Jerdon remarks that "the specimens shot below the Ghauts are considerably smaller than those obtained at a great elevation; the latter attained the size of *P. Shorei*, though not differing in colour from the smaller ones. The length varies from nine inches and a half to nearly twelve inches."

Of the closely allied division *Brachypternus*, Strickland, there seems to be a second species in southern India, additional to *P. aurantius* (v. *bengalensis*, &c.):

P. (Br.) micropus, nobis. Distinguished from *P. aurantius* by its inferior size, the wing (of an adult male,) measuring but five inches, instead of five and a half, as in several adult specimens (male and female,) of *P. aurantius*; bill to gape an inch and five-sixteenths, instead of one and five-eighths; and extended foot one and seven-eighths, instead of two and one-eighth. There is a general neatness and well defined character of the markings, as distinguished from those of *P. aurantius*, which arrests the eye at a glance: the frontal feathers, to a level with the anterior portion of the eye, are not tipped with crimson, as in the other; the black of the nape is continued lower upon the shoulders, considerably contracting the golden orange of the back; and the wings are duller aureous, contrasting more with the brilliant dorsal hue: the white markings of the throat and fore-neck are also reduced to small rounded oval spots, those of the breast being larger but similarly oval, and of the under parts below, narrower than in *P. aurantius*. I found this species upon a single specimen forwarded by Mr. Jerdon, but feel no doubt of its distinctness, especially when I recall to mind the close similitude of the three species of the preceding group; from which division the present one is only just separable.

Micropternus, nobis. By the same rule that *Brachypternus* is recognised apart from *Tiga*, this must be separated from *Meiglyptes*; having the inner fourth toe and claw minute. The colouring is also peculiar. Type *P. badius*, Raffles, under which, again, two species have been hitherto confounded.

1. *P. (M.) badius*, Raffles: *P. brachyurus*, Vieillot. Wing but four inches and one-eighth to four and a quarter long; head pale above, the throat dark; the feathers of the latter dusky, with pale lateral

margins; black caudal bars comparatively broad. Inhabits the Malay countries.

2. *P. (M.) phaiiceps*, nobis. *P. rufus*, Lath., apud Gray, nec Gmelin; *Rufous Indian Woodpecker*, Latham. Wing four inches and three-quarters long, and the rest in proportion: head subfuscous above, the throat pale; the feathers of the latter concolorous with those of the body, or nearly so, having lighter lateral margins; black caudal bars narrow. Inhabits India proper, extending eastward to Tipperah and Arracan.

The type of *Meiglyptes* is *P. tristis*, Raffles, v. *pæcilophus*, Temminck,* which together with an allied species, *P. (M.) brunneus*, also from the Malay countries, is referred to *Hemicercus* by Mr. Eyton.

P. (M.) jugularis, nobis, is a third species, of a shorter and thicker form than the two above-mentioned, and in size, form, and colouring, much resembling *P. (Hemicercus) canente*, Lesson, of which the female is *P. cordatus*, Jerdon: but it is readily distinguished by the very different form of the bill, by the buffy-white colour of the nape, and by the rays or specks of the same hue upon its black throat. Length about seven inches and a half, of wing four inches, and tail two and one-eighth; bill to forehead seven-eighths. Colour black or brown-black, varied with buffy-white, and an obscure dull crimson moustache in the male; occipital feathers elongated and black: neck whitish, more or less deeply tinged with buff, and continued as a streak along each side of the breast in front of the wings; rump also buffy-white, a broad oblique stripe of the same upon the wings, and their nether surface and edge are of this hue, the large alars being broadly banded at base internally, with slight narrow pale bars or series of small spots on their outer surface; forehead, throat, and sometimes crown, more or less speckled or rayed with the same pale colour that variegates the rest of the plumage. Inhabits Arracan and the Tenasserim provinces (specimens from the latter territory having been erroneously referred to *P. pæcilophus*, Tem., in X, 828).

P. (Hemicercus) concretus, Tem. It is probable that there are two species confounded under this name. All that I have seen are from the vicinity of the Straits, and accord with Stephens's "Sumatran va-

* These would seem enumerated as distinct in Mr. Eyton's catalogue, *Proc. Zool. Soc.* 1839, p. 106; but it is evidently a mistake of the printer.

riety" of *P. concretus* of Java. The adult male has the forehead and crown bright crimson, continued on a few of the uppermost and central of the long feathers of the occiput: in the young male, the forehead and crown are chesnut-brown, with a tinge of red on the medial long feathers of the occiput; the pale yellowish buff portion of the plumage of the upper parts being also more developed: and the female has the forehead, crown, and occiput, smoky-grey, like the sides of the head of the males.*

P. (Dendrocopus) darjellensis, nobis. This Woodpecker is described in *J. A. S.* XI. 165, as the adult of *P. himalayensis*, Jardine and Selby; and true *P. himalayensis* is there given as the young: but the two are distinct, the present one having a larger bill, measuring an inch and three-eighths to forehead, in addition to its under parts being streaked with black; its white wing-spot is also considerably smaller. Very common at Darjeeling, and in Nepal. Mr. Hodgson sent it by the hybrid name *majoroides*, which can scarcely be adopted.

The other Indian Woodpeckers of this subgenus are as follow:—

2. *L. himalayensis*, Jardine and Selby, *Ill. Orn.*, 1st. series, pl. CXVI. Found chiefly, I suspect, to the westward of Nepal.

3. *P. cathpharius*, Hodgson, nobis, *J. A. S.* XII, 1006. Nepal: common at Darjeeling.

4. *P. hypertyrhus*, Vigors, *P. Z. S.* 1831, p. 23; Gould's 'Century,' pl. L. Remarkable for the slender form of its bill. Himalaya.

5. *P. Macei*, Cuv.; figured in Hardwicke's *Ill. Ind. Zool.*: *P. analis*, Tem.; *P. minor*, apud Raffles and Horsfield; *P. medius* from India, apud Latham. Northern India generally, and Malay countries. The only species of the subgenus found in Lower Bengal, where exceedingly common, as it also is in the vicinity of the Straits. It frequently occurs, likewise, in collections from the Himalaya.

6. *P. brunnifrons*, Gould's 'Century,' pl. LII; Vigors, *P. Z. S.* 1831, p. 176.: *P. auriceps*, Vigors, *ibid.* p. 44. Himalaya.

7. *P. maharattensis*, Latham: *P. aurocristatus*, Tickell, *J. A. S.* II, 579: figured in Gould's 'Century,' pl. LI., and also by Hardwicke and Gray. Hilly regions of India generally.

* *P. validus*, Tem., is allied in form to *Hemicercus*, but cannot be arranged under it: and as another marked sub-genus, I may indicate the *P. funebris*, Valenciennes, v. *modestus*, Vigors.

8. *P. pygmaeus*, Vigors, *P. Z. S.* 1830, p. 44. A description of this species, from a series comprising older and finer specimens than those from which the Latin diagnosis was drawn up, may here be offered. Allied to the two next, but larger; the wing measuring from three inches and a quarter to three and a half, and tail one and seven-eighths to two inches. Four middle tail-feathers wholly black, and the next white only on its exterior margin: this constituting a good distinction, as in all the following the whole of the tail-feathers are spotted with white. The male has a crimson occipital crescent, the lateral halves of which unite only in fine old specimens: in younger examples, this crimson is confined to a mere lateral tuft, as in the following; and I have seen specimens in every degree intermediate. Forehead and crown ashy-brown, the crimson of the occiput surrounded with black externally, forming a streak over each eye, continued to meet and expand posteriorly. Another and brownish-black streak, more or less developed, passes backward from below the eye; and between this and the last is a large triangular white patch on the sinciput. Upper parts black, with white cross-bands on the back, and the usual rows of white spots on the wings: outermost and penultimate tail-feathers barred on the outer web with white, and having a single white bar, and sometimes two, crossing the feather towards its tip; throat dull white; the rest of the under parts brownish-white, with narrow dark central lines to the feathers. The hoary-grey colour upon the back mentioned in Mr. Vigors's description, must refer to that of the base of the feathers, as shewn in a specimen thin of plumage. Common in the Himalaya.

9. *P. canicapillus*, nobis. Differs from *P. moluccensis* in the much blacker hue of its upper parts, in the pale ash-colour of the head, a little tinged with brown and bordered laterally with black, from amid which appears the slight crimson sincipital tuft of the male; the size also is rather larger, the wing measuring three inches and one-eighth to three and a quarter, tail one and three-quarters, and bill to forehead five-eighths: the under parts are whitish, purer on the throat, and the rest marked with central dusky-black lines. Common in Arracan.

10. *P. moluccensis*, Latham; figured by Hardwicke and Gray. Distinguished by its prevalent brownish or sooty-black colour, and its rufescent brown head and streak passing through the ear-coverts. Hab. Central and Southern India.

10. *P. nanus*, Vigors, *P. Z. S.* 1830, p. 172. Has a larger bill than either of the three preceding species, measuring three-quarters of

an inch to the forehead; wing three inches and a quarter. The breast is marked with dusky *oval spots*, passing into streaks below; the aspect of the under parts being much more spotted and less streaky than in the foregoing; a very strongly marked white line commences above the eye (as in the last), and is continued along the sides of the occiput to the nape; and another broad white line from the angle of the mouth is continued to below the ear-coverts. This species is alluded to as a variety of *P. moluccensis* by Mr. Jerdon; being thus met with in Southern India, as well as in the Himalaya.*

Of foreign Woodpeckers in the Society's museum, one of which I can find no description, may be designated

P. (Colaptes) hypoxanthus, nobis. Length above a foot, of wing five inches and three-quarters, and tail five inches; bill to gape one and three-quarters, its form less curved than in *P. auratus*, the lower mandible not being arched at all. Upper parts crimson, darker on the wings, and passing to yellowish olive-green on the external webs of the large alars, the secondaries and tertiaries with their coverts being broadly margined with dark crimson externally, and the primaries having yellow shafts: tail black above, its outermost feathers freckled with brownish-yellow: a large and broad crimson moustache, and the space between this and the crown, comprising the lores and ear-coverts, greenish-yellow: throat black, the feathers edged with yellowish; those of the breast black margined with dark crimson, and leaving a pale central mark on each, inclining to be linear on those of the fore-neck, and gradually assuming the form of a transverse bar more downward: the rest of the under parts and inside of the wings bright greenish-yellow, with some black bars anterior to the flanks. Bill blackish; and legs brown. Most probably from some part of South America.

Before quitting the *Picidæ*, I may remark that the Himalayan Honeyguide (*Indicator xanthonotus*, nobis, *J. A. S.* XI, 166, and XII, 1010,) has a much shorter beak than in the various African species; with which it accords, however, in all other respects.†

* The whole of the above are in the Society's museum: and I have before remarked that *P. Elliotti*, Jerdon, which was referred by that naturalist to the present sub-genus, is the true *P. (Chrysocolaptes) goënsis*, v. *melanotus*, nobis, passim.

† To give some idea of the present state of the Society's museum, in the department of Ornithology, it may be here mentioned that of the Linnæan genus *Picus*, there are now 121 mounted specimens, appertaining to 49 species; and of these but 10 speci-

Cuculidae. Of the series of this family grading from *Dasylophus* to *Taccocua* of Lesson, the Indian and Malayan species may be thus classified. *Rhinortha* belongs to the particular group, but ranges apart from the graduated succession observable in the rest: and of this genus, I have to remark that the supposed two species which have been hitherto currently admitted, are one and the same; *Rh. lucida*, Vigors, v. *Anadænus rufescens*, Swainson, v. *Phœnicophans viridirostris*, Eyton, referring to the young, and *Cuculus chlorophæus*, Raffles, v. *An. rufus*, Swainson, to the adult; the latter being also described, and the former figured as *Bubutus Isidoria* by M. Lesson in the zoology of M. Belanger's Voyage. It will now rank as *Rh. chlorophæa*, (Raffles); and I have suggested that perhaps a second species exists in the *Cuculus melanogostir* of Vieillot, vide *J. A. S. XI.*, 924.

Dasylophus, Sw. Species, *D. Cumingi*, (Fraser,) and *D. superciliosus*, (Cuv.,) vide *J. A. S. XI.*, 925.

Phœnicophaus, Vieillot.—*A.* With the nareal apertures narrow, and placed near the edge of the bill. (Cuv.) 1, *Ph. pyrrhocephalus*, (Forst.,) vide *J. A. S. XI.*, 924: (this species has the papillose naked red skin on the sides of the face very greatly developed; its alleged Cingalese habitat needs verification, especially as it is likewise stated to inhabit Africa.) *B.* “Nostrils elongate, and situate at the base of a groove which extends nearly to the middle of the beak.” (Horsfield.) 2, *Ph. melanognathus*, Horsfield. *C.* Nostrils elongate, basal, and oblique; but no groove to the bill. 3, *Ph. sumatranus*, Raffles, *D.* Nostrils basal, with rounded aperture. 4, *Ph. viridis*, Lev. (*Cuculus melanognathus* apud Raffles, &c.): 5, *Ph. Diardi*, (Lesson; *Ph. tristis* apud, *J. A. S. XI.*, 928, and probably *Ph. Crawfordii*, Gray). *E. Incertæ sedis.* 6. *Ph. (?) calorhynchus*, Tem., erroneously stated to be identical with *Zanclostomus javanicus*. Three of the above are in the Society's museum, viz. *Ph. viridis*, *Ph. sumatranus*, and *Ph. Diardi*; these being all common in the vicinity of the Straits. The first has a more tumid bill, and the second a proportionally

mens (of 7 species) are foreign to India and the Malay countries. Of other *Picidae* (consisting of the genera *Yunx*, *Picumnus*, *Microcolaptes*, and *Indicator*, the *Bucco* group being excluded), we have 10 mounted specimens, of 7 species. Every described (or at least every authenticated) Indian species of Woodpecker is now in the collection: but there are several yet wanting from the eastern islands. *July 6, 1845.*

longer bill, than in the others ; but all are closely allied, and have a large naked space surrounding the eyes.

Zanclostomus, Swainson. *A.* Bill green ; nostrils with rounded oval aperture ; small bare and papillose skin surrounding the eyes ; tail greatly elongated. 1, *Z. tristis*, (Lesson ; *Ph. longicaudatus*, nobis, *J. A. S.* XI, 1095.)—*B.* Allied to last, with green bill ; nareal orifices oval and minute ; no expanded and papillose naked space surrounding the eyes. 2, *Z. viridirostris*, Jerdon.—*C.* Red bill, and nareal aperture linear ; no papillose skin on the face. 3, *Z. javanicus*, Horsfield, &c., vide *J. A. S.* XI. 1097 ; * *Piaya erythrorhyncha*, Lesson.—*D.* A fourth section would seem to be constituted by *Z. flavirostris*, Swainson, ‘Birds of W. Africa,’ *Nat. Libr., Orn.*, VIII, p. 183, and pl. XIX. Should it be thought necessary to separate the two first, they should rank under *Melias* of Lesson.

Taccocua, Lesson. This will comprehend the species confounded under the “Sirkeer Cuckoo” of Latham. As compared with the preceding, they have a shorter and more compressed bill, approaching nearly in form to that of *Centropus* ; and they further approximate the latter genus in the more than subspinous character of their plumage, and in their ground habits, although their inner hind claw is short and curved. The following are now for the first time distinguished.

1. *T. infuscata*, nobis : probably *Coccyzus chrysogaster* of Royle’s list of birds from the vicinity of Saharanpore. At least two species of this group are indicated in Latham’s description of his *Sirkeer Cuckoo* (*Gen. Hist.* III, 267), the present being that first noticed by him, and being characterized by its larger size and infuscated colouring. “Length nineteen inches at least : * * * plumage on the upper parts dusky, with a tinge of purple.”—The specimen before me agrees with others which I have seen from the Himalaya, and measures nineteen inches in total length, the tail ten inches, its outermost feathers three inches and a half less ; wing six and a half ; tarse an inch and five-eighths. Bill (as in the others) bright cherry-red at base, yellow at the tip, with a triangular black spot on each side of the upper mandible : feet dusky-leadene, browner on the tarse. In all three species, the upper parts may be described as brown, washed with dusky-green, the feathers having shining black shafts ; but in the Himalayan bird,

* This species has the somewhat firmer tail of a true *Phœnicophaus*.

scarcely a trace of the brown is visible; lower parts paler, slightly washed with ferruginous on the fore-neck and breast, the belly and lower portion of the tibial plumes deep ferruginous, of a much darker shade than in the other species: tail with all but its middle pair of feathers broadly tipped with white, as in both the others. Peculiar, I suspect, to the sub-Himalayan region.

2. *T. sirkee*; *Centropus sirkee*, Hardwicke and Gray: *C. cuculoides*, Smith and Pearson, *J. A. S. X*, 659. This is probably that, next mentioned by Latham as figured in a drawing; and it is of course the Cawnpore species subsequently noticed by him as weighing "four ounces eight drachms." I believe it also to be that figured by Hardwicke, and referred to by Latham as weighing but "three ounces six drachms and a half;" a difference from the preceding which might depend upon condition, and to a certain extent on sex, these birds being often extremely fat. Describing from Hardwicke's drawing, Latham gives the two middle tail-feathers as "eight inches in length," but from the published copy of the same drawing, I should say that they were nearly ten inches. A fine specimen before me (from Cawnpore) measures seventeen inches in length, the tail nine and a half, its outermost feathers three and three-quarters less; wing six inches; and tarse an inch and a half. Upper parts much paler and more brown than in the preceding species, having scarcely a trace of the green; below paler ferruginous, more generally and uniformly diffused on the belly, flanks, and tibial plumes, and tinging much more deeply the fore-neck and breast. Mr. C. W. Smith describes the upper parts as being of a brownish satin colour, a term which does not convey a very definite idea in the absence of a specimen, but which is nevertheless sufficiently recognisable when the bird is under examination: the hue is lighter and more rufescent than in the next species. Hab. Bengal.

3. *T. Leschenaultii*, Lesson: *Zanclostomus sirkee*, apud Jerdon. Distinguished by its inferior size, and generally more or less ashy fore-neck and breast, and whitish throat; the ferruginous colour of the belly is scarcely so deep as in the last, and there appears always to be a marked distinction of hue between the breast and belly, although the former is more or less tinged with ferruginous; whereas in the Bengal species there is no such marked distinction of hue, the fore-neck and breast being concolorous with the belly, or very nearly so, shading im-

perceptibly from one to the other. In the hue of its upper parts, this species is intermediate to the two others, but approaches nearer to the Bengal one. Its entire head has often a distinct ashy cast, not seen in the others. Length fifteen or sixteen inches, the tail eight or nine inches, its outermost feather three inches and a half less; wing five and a half to six inches; tarse an inch and five-eighths, but considerably less robust than that of *T. infuscata*. Inhabits the peninsula of India.*

Centropus, Illiger. The variations of plumage exhibited by the birds of this genus are very remarkable, and appear oftentimes to be independent of age or sex. Having ascertained the identity of my *C. dimidiatus*, *J. A. S.* XII, 945, with *C. lepidus*, Horsfield, but which species will bear the prior name of *C. Lathamii*, (Shaw), I was subsequently led to suspect that *C. sinensis*, (Shaw), *J. A. S.* XII, 247, might prove to be analogously identical with *C. philippensis*; notwithstanding the great difference of plumage in both cases: and upon more minutely examining the Society's Chusan specimen of *C. sinensis*, I found, on turning aside the feathers of the nape, some glossy steel-black ones just put forth, different in texture from the old plumage, and exactly according with those of ordinary adult *philippensis*; moreover, the two entirely correspond in size and proportion, and I feel now perfectly satisfied of their being one and the same.

In my description of *C. philippensis*, *J. A. S.* XI. 1099, it was mentioned that some of the young birds, in their first or nest dress, were throughout unbarred, being coloured much as in the ordinary adult, except that the rufous is less bright and is deeply infuscated upon the back, while most others of the same age are conspicuously barred throughout, as in a young Cuckoo. In general, these moult into the usual adult dress, figured by Horsfield as *C. bubutus*; but some would appear to assume a peculiar second dress (in which state it is *C. sinensis*), analogous to that of ordinary occurrence in *C. Lathamii*, and which seems likewise to be analogous to the *hepaticus* plumage of *Cuculus canorus*, more frequent in *Cuc. poliocephalus* (*v. himalayanus*,

* These three species of *Taccocua* appear more decidedly distinct, when seen together, than perhaps would be inferred from the above descriptions: some might deem them local varieties merely of the same, in which case intermediate specimens should occur in intermediate districts; but even then races so nearly allied might perhaps have intermingled, like *Coracias indica* and *C. affinis*; but to me they certainly appear as distinct as *Alcedo grandis*, *A. ispida*, and *A. bengalensis*.

Vigors), in *Cuc. tenuirostris*, Gray, and its Malayan near ally, *Cuc. merulinus* (v. *flavus*). Raffles was aware of this variation of plumage in *Centr. Lathamii*, which he identifies with *Cuculus tolu*, Auct., (a Madagascar species, or more probably variety of several alleged African species, all of about the same size, as *Centr. maurus*, *C. rufus*, and *C. senegalensis*, Auct.,) which it undoubtedly makes a near approach to in the instance of some specimens; but he certainly reverses the order of progression in the states of plumage, in his remarks upon the latter, cited in *J. A. S.* XI, 1103. One young specimen, in undoubted nestling garb, I have described in XII, 945 (at the end of the footnote); the second dress (probably more frequent in the female sex) in XI, 1003; and the fully mature plumage as *C. dimidiatus*, together with the notice of the young: in a fine series now before me, from Bengal (vicinity of Calcutta), Cuttack, and Malasia, are some intermediate to what I have now specified as the second and third phases, but which were not killed during moult, the feathers themselves appearing as though they had been in process of changing colour; but I think it more likely that they had been put forth thus intermediate: these have the rufous back more infuscated, a greater or less number of the shafts of the feathers yellowish-white, on a black or rufous ground, according to the part, and in one instance many intermixed pale and barred feathers on the under parts, the black bars on some of these being enlarged and more or less tending to blot the entire feather. The *Polophilus Lathamii* of Shaw is decidedly a specimen in this imperfectly mature dress; the thoroughly mature garb differing only from that of *C. philippensis* in the less deeply rufous hue of the mantle and wings, but the species being readily distinguishable by its much smaller size, and the shorter and deeper form of the bill.

Analogous differences present themselves in the *Centr. phasianus* of Australia; and I doubt not in the alleged African species, of several of which I have suggested the identity, having no means of personally investigating the problem. In the Malayan islands, the *Centr. melanops*, *Par. Mus.*, of Lesson's *Traité*, vide *J. A. S.* XII, 946, is probably also to be referred to *C. Lathamii*; and *C. bicolor*, *ibid.*, perhaps to the same, or to *C. philippensis*. A distinct species occurs in *C. viridis*, Scop., Lath., (founded on the *Coucou vert d'Antigue* of Sonnerat,) v. *C. affinis*, Horsf., vide *J. A. S.* XIII, 391; and another in *C. bengalensis*, Lath., (founded on the *Lark-heeled Cuckoo* of Brown's

Zoology,*) v. *C. pumilus*, Lesson, vide XII, 945; but with these two I am unacquainted.

Of the species of *Cuculus*, I have now nothing further to add, than that I feel satisfied of the identity of *C. niscolor*, Hodgson, *J. A. S.* XII, 943, with the common *C. fugax*: of *C. micropterus*, a particularly fine male has the wing as much as eight inches and a quarter long, and the rest in proportion; while of *C. canorus*, an equally fine male has the wing fully nine inches long; the general characters of the two birds, however, rendering them easy of distinction: of *C. Sonneratii* (v. *pravatus*, Horsf., v. *rufovittatus*, Drapiez), a specimen in nestling dress is altogether more coarsely barred than the adult, with pale rufescent upon a black ground above, the under parts white banded with dusky, and having the cross bars broader than in the mature plumage; bill but fifteen-sixteenths of an inch to gape, but the general resemblance to the adult still sufficient to indicate the species at a glance, the half-feathered tarse helping to characterize it apart from *C. tenuirostris* and *C. merulinus*: lastly, of *Eudynamys*, besides the Australian Coë, which was identified with that of India and the Malay countries by Messrs. Vigors and Horsfield, but which Mr. Swainson has separated (on account of its considerably larger size,) as *Eu. australis*, the *Cuc. taitensis*, Sparrman, of New Zealand and the South Sea Islands, is referred to this genus by Mr. G. R. Gray, (vide Appendix to Dr. Dieffenbach's 'New Zealand,' Vol. II, 193).

Caprimulgidæ. Three allied species of this tribe appear to have been lately confounded under the name *Caprimulgus macrurus*, Horsfield. These are—

1. *C. albonotatus*, Tickell, *J. A. S.* II., 580: *C. gangeticus*, nobis, mentioned in *An. and Mag. Nat. Hist.* 1843, p. 95; regarded as distinct from *macrurus*, Horsfield, in *J. A. S.* XII, 178 (*bis*),—but referred to *macrurus* in XI., 586, an identification in which Dr. Horsfield coincided. The size, however, of *C. macrurus* of Java is considerably smaller; and there is a closely allied species in Southern India, which, agreeing better in dimensions with the Javanese bird, I therefore presumed might be identical with the latter. Mr. Jerdon, who has treated critically of the Indian species of this genus in the

* On the same plate is figured a "Spotted Curucui" from Ceylon, which is evidently the *Cuculus (Chrysococcyx) lucidus*.

second No. of his 'Illustrations of Indian Ornithology,' provisionally assented to this suggestion; but with proper distrust, "in a genus where the plumage is so very similar," remarked that the bird of Southern India might yet prove to be distinct, in which case he proposed for it the specific name *atripennis*: Mr. Strickland, however, has informed me that he had lately received from Mr. Jerdon "a specimen of his small *C. macrurus* from the Neilgherries, which evidently seems to be the same as Horsfield's *macrurus*"; yet it does not appear that the latter naturalist actually compared the two together, and the Society has now a distinct Malacca species which I feel very confident will prove to be the true *macrurus* of Horsfield, and I as little doubt that the species of Southern India is *C. mahrattensis* of Sykes. That immediately under consideration is acknowledged by Mr. Strickland to be quite distinct, and this naturalist has suggested for it the felicitous name *gagateus*, "from its rich agate-like markings:" of its identity, however, with the species named as above by Captain Tickell, I feel no doubt, although the statement of that observer that the sexes are alike, does not fully apply. It is a common bird in Lower Bengal during the cold season, and appears to be generally diffused throughout Northern India, but it has not been met with in the southern part of the country, where it would seem to be replaced by the next. A fine male of *C. albonotatus* measured thirteen inches long, by twenty-five in spread of wing; the closed wing nine inches, and tail seven inches: a small female eleven and a half, by twenty-one inches; wing eight and three-eighths, and tail six and five-eighths. The tarse (as in the others,) is anteriorly feathered nearly to the toes. This bird has the crown and tertiaries light cinerascens, minutely mottled, and marked with a stripe of black dashes along the middle of the crown: upper range of scapularies black, more developed in the male, and bordered, more broadly externally, with rufescent-white: lores and ear-coverts brown: wing-coverts black, mottled with rufous, and largely tipped with rufescent-white: a broad white patch in front of the neck, as in several allied species: there is a band of white on the primaries, contracted and rufescent in the female; and the two outer tail-feathers are broadly tipped with white in the male, and much less broadly tipped with slightly mottled pale rufescent in the female. Altogether the females are much paler, and browner or less ashy, than the other

sex. The rictorial bristles are conspicuously white at base, and black for the remainder of their length.

2. *C. mahrattensis*, Sykes, *Proc. Zool. Soc.* 1832, p. 83: *C. macrurus* apud Jerdon, *Ill. Ind. Orn.* (vide his description of *C. indicus*). Very similar to the last, but much smaller; a male now before me having the wing but six inches and a half in length, and tail four and three-quarters: in another the wing measured seven inches, and the tail five; but Mr. Jerdon assigns "about seven inches and a half" as the length of the wing, and "five and a half to six inches," as that of the tail. He adds, that he considers it may perhaps be the *C. asiaticus*, var., of Latham. In the only specimen before me, there is a russet tinge about the nape, back, and breast, not seen in the preceding species. Formerly, I regarded what Mr. Jerdon pronounces to be a mere pale individual variety of the variable *C. indicus*, as Sykes's *mahrattensis*; but looking more attentively to the description of the latter, the statement that the two outer tail-feathers are tipped with white, cannot refer to any variety of *C. indicus*, wherein the four outer tail-feathers (or all but the middle pair,) have subterminal white tips, the extremities being always dark. In other respects, I conceive that Sykes's description will apply sufficiently to the generality of specimens; particularly as he states that it "differs from *C. monticolus* and *C. asiaticus*, in the prevalent greyness of the plumage, and in the absence of the subrufous collar on the nape." Hab. Southern India.

3. *C. macrurus*, Horsfield, *Lin. Trans.* XIII, 142. To this I refer two Malacca males, and two Arracan females, in the Society's collection, which are intermediate in size to the two preceding, and are further distinguished by their much darker general colouring, and the males by having the primaries black to the end, instead of being mottled towards their tips. Wing seven inches and three-quarters in the males, and tail six inches: in the females, the wing measures seven and a half, and tail five and three-quarters: the males have the crown and nape dark brownish-ashy, minutely mottled, with black dashes along the middle of the crown, as in the preceding species, and the scapularies and wings are similarly marked with black, set off with bright rufous-white, the margins so coloured being narrower than in the others: breast and fore-part of the belly dark, and contrasting strongly with the light buffy tint of the hind-part of the belly, vent, and lower tail-coverts, which last tend to be whitish in one specimen, barred with

black: the primaries underneath have no rufous bars whatever, or mottlings either at base or tip, and these are but imperfectly developed towards the base of the tail underneath: but the white spots on the middle of the primaries, and largely tipping the two outer tail-feathers, are the same as in the others. There is also the same conspicuous white mark in front of the neck, which is represented by pale buff in the female. The latter is altogether browner and less ashy, particularly on the head and neck; but is still considerably darker than the *males* of the other species; the contrast of the dark breast and pale belly and vent is much less decided; the primaries are barred at base with rufous, and slightly so towards the tip, the white of the male being represented by a contracted rufous bar; and the two outer tail-feathers are also much more narrowly tipped, with rufescent instead of pure white. On comparison of these three species together, particularly with a good series of specimens, it is impossible not to regard them as distinct, however nearly allied.

The other Indian species are—

4. *C. asiaticus*, Lath.; *C. pectoralis*, Cuv., Levaillant, *Ois. d'Afr.*, pl. XLIX, apud *Dict. Class.*; *Bombay Goutsucher*, Latham. This small, common, and generally diffused species over the country, is allied in colouring to the three last, but has the tarse bare, and the sexes are alike in plumage. Mr Jerdon is "still inclined to believe that the species figured by Hardwicke and Gray as *asiaticus*, differs from the common kind. I obtained," he adds, "what answers to this very closely in the north of the Deccan. It differs from the common one in its larger size, more prevalent and lighter grey tint of the plumage, and in some other trifling points; but I have now no specimens for comparison." Could this have been *C. mahrattensis*? I certainly think there can be little doubt that Hardwicke's figure was taken from a Bengal specimen, and is meant to represent the common species. *C. affinis*, Horsfield, is a Javanese species allied to the present one, and this and *macrurus* are the only kinds noticed in Dr. Horsfield's list of the birds of Java; while, in Sumatra, Sir Stamford Raffles also speaks of but "two varieties, one with much brighter and more marked colours than the other. They are very abundant in the neighbourhood of Bencoolen." Different species of *Lyncornis*, as well as of *Batrachostomus*, are however common in the vicinity of the Straits, and the former of these would have been classed by Raffles in *Caprimulgus*.

5. *C. indicus*, Lath., Jerdon : *C. cinerascens*, Vieillot. This handsome species appears subject to considerable variation, in its dimensions, depth of colouring, greater or less development of the black on its upper-parts and inversely of the fulvescent-white upon the scapularies, wing-coverts, &c., and also in the amount of the rufous barring upon the primaries, which I think is generally less developed in the smaller specimens of both sexes: its tarse is feathered; and all the caudal feathers of the male, except the middle pair, have a white spot near the tip, which in the female is scarcely indicated. In general, these white spots have only a slight dark margin, tipping the feather; but in one variety before me, with wings as much as eight inches and a half long, the white on the tail-feathers is somewhat contracted in quantity, and has a dark border fully half an inch in breadth, tipping each feather*. This species is, I think, commonest in the sub-Himalayan region, but it extends sparingly over India generally, and I have once known it to be shot in the neighbourhood of Calcutta.

6. *C. monticolus*, Franklin : *Great Bombay Goatsucker*, Latham. In this the male is distinguished by having its two outer tail-feathers on each side wholly white, to near the tip, whereas in the female these are barred throughout rufous and black. The female is also paler than the male; and both sexes are, throughout, more uniformly, minutely mottled ashy, than in either of the other species, this plainness of colouring being relieved by the pale rufescent hue of the borders of the middle scapularies, by a white throat-band in the male, considerably less bright and contrasting in the female, and by the white on the primaries and tail of the former. With *C. asiaticus* it accords in having the tarse naked, and a sort of collar surrounding the neck. I have twice obtained it near Calcutta, and it appears to be sparingly diffused throughout the country from the Himalaya southward; Capt. Abbott has also sent it from Arracan.

* The specimen here adverted to is probably not Indian, but from the eastward; and may prove to be of a distinct species: and one Neilgherry specimen forwarded by Mr. Jerdon has also much the appearance of being distinct; in this, the ashy portion of the plumage is much more albescent than usual, contrasting strongly with the black, and there is scarcely a trace of rufous, except some broken bars of this colour at the base of the primaries; a row of whitish spots bordering the scapularies shew very conspicuously; the white spots on the tail-feathers are larger than usual; and the wing measures but seven inches and a quarter long: it is a remarkably handsome bird.

That very beautiful bird, the *Lyncornis cerviniceps* of Gould, extends so high as Arracan, where it is not very uncommon; and the Society also possesses *L. Temminckii* from Singapore. *Bombycistoma Fullertonii*, Hay, *J. A. S. X*, 573, is identical with *Batrachostomus auritus*, (V. and H.), Gould, which name it must bear; and with respect to the supposed *Podargus* (or rather *Batrachostomus*) *javensis* of Coorg, in southern India, noticed in *XI*, 798, Mr. Jerdon has since informed me that "it is not that species, but a smaller one, about eight or nine inches long; of which," he remarks, "I have seen a Malacca specimen. It is, I think, distinguished in Lesson's '*Manuel d'Ornithologie*,' which I do not possess. I can perfectly trust to the descriptions I received of it, and hope yet to obtain specimens." Most probably it is the *Podargus* (now *Batrachostomus*) *stellatus*, Gould, *Proc. Zool. Soc.* 1837, p. 43, which, together with *Bat. auritus* and *B. javensis* (v. *Podargus cornutus*, Tem.), inhabits the Malay peninsula.

Cypselidæ. Swifts. To Mr. G. R. Gray is due the credit of first separating the *Hirundo esculenta*, Lin., (the constructor of the celebrated edible birds'-nests,) from the group of Swallows, and transferring it, as a new and distinct generic type, *Collocalia*, to that of the Swifts: and I can now announce a second representative of this type in the *Hirundo unicolor* of Jerdon, since regarded by him as a *Cypselus*, upon which I altered the specific name to *concolor* (*J. A. S. XI*, 886), as there was previously a *Cypselus unicolor*; but it must now rank as *Collocalia unicolor*, (Jerdon). From the true Swifts (*Cypselus*), the species of *Collocalia* differ in their considerably less robust general conformation, in their comparatively very slender tarsus and toes, and in having the hind-toe distinctly opposed to the three anterior toes. Mr. Jerdon "only found this remarkable species in the Neilgherries, and about the edges of the hills. It flies in large flocks, and with very great speed." The Society has also received it from Darjeeling. Is it, therefore, exclusively a mountain species, which constructs glutinous nests like the other, but in mountain caverns? Or does it resort, like its congener, to the caverns of cliffs overhanging the sea-shore during the breeding season, in this case being perhaps the constructor of the edible nests which are found on the western coast of the peninsula of India, as, for instance, in the group of small islands about eight miles west of Vingorla (which is 275 miles from Bombay), commonly known as the Vingorla rocks, where about a hundred-

weight of these nests are produced annually? To myself, who, long ago, following the accounts of the edible nests being constructed by a true *Hirundo*, found this a stumbling block to one of the distinctions which I drew between the Swallows and the Swifts, I confess it yielded some gratification to find my suspicions in this matter completely confirmed; for the nest of *Cypselus apus* of Europe is essentially similar to that of *Collocalia esculenta*, containing a large quantity of glutinous matter, which there can be no doubt is secreted by the very large salivary glands of the bird*; whereas in *Hirundo urbica*, the nests of which species might be thought to present a marked analogy, the fabric is constructed of mud, or, as Vieillot remarks, worm-casts are selected for the purpose, and the birds may be commonly seen on the ground collecting material of the kind, many of them often resorting to the same wet place,—the Swifts, on the contrary, never descending to the ground at all. The two groups of Swallows and Swifts present a very remarkable instance of what is termed *analogy*, or mere external and superficial resemblance, as opposed to *affinity*, or intrinsic physiological proximity. Though externally resembling in their *adaptive characters*, as a Cetal may be said to present a superficial resemblance to a fish, sufficient indeed to have occasioned the group to be still popularly classed with fishes, the difference between the Swifts and Swallows is analogous in kind, but inferior in degree, to that which necessitates the Whales and Porpoises to be removed altogether from among fishes: and the same intrinsical similarity in the essential structure, which compels us to arrange the Cetals in the class of mammalia, equally approximates the Swifts to the *Trochilidæ* (or American Humming-birds), while the Swallow conformation is modelled on the ordinary passerine type, from which it deviates only in external modifications, having reference to mode of life. In the Swift, as in the Humming bird, the entire structure, alike as regards the rudimental anatomy and the external characters, concurs to produce the maximum of volar power; whereas in the Swallows there is no such general concurrence, but the potency of flight seems entirely due to the development of the wings and tail, the sternal apparatus in no respect differing from that

* Vide *Mag. Nat. Hist.* 1834, p. 463 *et seq.* The nests there described passed into my possession, which enables me to state that the glutinous matter was in greater quantity than would appear from the account given by Mr. Salmon. The fact is, it constitutes the basis of a Swift's nest, by which is made to adhere the various light substances gathered in the air by these birds, when such are blown about on a windy day.

of a Sparrow, or a Robin, but retaining the peculiar configuration observable throughout the passerine type, in all its integrity. It would be out of place here to pass in review the principal details of conformation of the groups to which the Swifts and Swallows respectively belong, and to shew how essentially they differ in the whole skeleton, in the alimentary organs, that of voice, &c. ; even to the structure of the feathers, and to the circumstance that the Swifts (like the *Trochilidæ* and *Caprimulgidæ*.) have never more than ten *rectrices*, while the Swallows have twelve, in common with the whole of the grand series of passerine birds, save one or two peculiar exceptions, of which the Drongo (or King-Crow) group is the most remarkable one. I shall conclude for the present by indicating the Indian species of *Cypselidæ*.

These fall under four generic heads.

Acanthylis, Boie, v. *Chaetura*, Stephens : from which *Pallene* of Lesson, containing the Indian species, is placed separately by Mr. Gray, for reasons with which I am unacquainted. Mr. Hodgson, also, says of the Himalayan species, that it is "certainly not a *Chaetura* as defined by Stephens. I have set it down in my note book," he adds, "as the type of a new genus, called *Hirundapus*," (a bad hybrid name, which holds priority over *Pallene*). Mr. Swainson, however, had long previously figured the same bird as a true *Chaetura*, from which genus I cannot perceive in what it differs.

1. *Ac. gigantea*, (Tem.) Inhabits the Malay countries, extending northward to Arracan, where it is of rare occurrence; it also occurs in the Neilgherries. Chin albescent, but not forming with the throat a large pure white patch, as in the next species; and the spinous tail-feathers are much stouter, with their webs tapering, and not terminating abruptly as in the other.

2. *Ac. caudacuta*,* (Lath.): *Hirundo fusca*, Shaw; *Chaetura australis*, Stephens; *Ch. macroptera*, Swainson; *Ch. nudipes*, Hodgson, *J. A. S.* v. 779; *Cypselus leuconotus*, *Mag. de Zool.* 1840, *Ois.* pl. XX, and figured in the *Souvenirs*, &c. of M. Adolphé Delessert, pt. II, pl. IX,

* The Himalayan bird is certainly the *macroptera* of Swainson; and as this is given as a synonym of Latham's *caudacuta* by Mr. Strickland, (*An. and Mag. N. H.* 1843, p. 337,) on the authority of the drawing upon which Latham founded his description, now in the possession of the Earl of Derby, I of course bow to the decision of that naturalist; though Latham's statement that it has the "forehead white, and throat very pale dusky," certainly applies better to *Ac. gigantea* of the Malay countries.

p. 25. Himalayan; and said to be the same as the Australian species, though I question if specimens have ever been actually compared.

Cypselus, Illiger. Ordinary Swifts.

1. *C. melba*, (L.): *C. alpinus*, Tem. Neilgherries, Travancore, &c.; also Southern Europe.

2. *C. pacificus* (? Lath.): *C. australis* (?), Gould, *Proc. Zool. Soc.* 1839, p. 146; vide *J. A. S.* xi, 886. Penang.

3. *C. leuconyx*, nobis. Closely allied to the last, and described from a Deccan specimen in *J. A. S.* xi, 886: a Calcutta specimen (being the only one which I have yet heard of) flew into the window of a house in Garden Reach, and was obligingly presented to the Society by Willis Earle, Esq. It minutely agrees with my description of the other, except that the wing is a quarter of an inch longer. The marked difference in size of foot from the preceding species forbids their being considered of one kind.*

4. *C. affinis*, Gray, Hardwicke's *Ill. Ind. Zool*: *C. nipalensis*, Hodgson, *J. A. S.* v. 780. India generally; very common about Calcutta.

5. *C. palmarum*, Gray, *ibid.* India generally; common.

Collocalia, G. R. Gray.

1. *C. unicolor*, (Jerdon): *Cypselus concolor*, nobis, *J. A. S.* xi, 886. Darjeeling; Neilgherries.

2. *C. esculenta*, (Lin.) Malay coasts: common in the Nicobar islands; and Captain Phayre informs me that "it is to be had on the rocky islands off the southern part of the coast of Arracan:" it also (or possibly the preceding species, vide p. 210,) breeds along the Malabar coast, and so far northward as the Vingarla rocks.

Macropteryx, Swainson.

M. klecho, (Raffles): *Cypselus longipennis*, Tem. Central and Southern India, and Malay countries.

Mr. Swainson gives, as a second species, the Sumatran *Cypselus comatus*, Tem., which I have not seen; and as a third, *C. mystaceus*, (Lesson,) who applies the name *Pallestre* to the genus.

July 12th, 1845.

E. B.

* There is a *Cypselus vittatus*, from China, figured in the 2nd series of Jardine and Selby's 'Illustrations of Ornithology,' which I believe is allied to *C. pacificus* (?) and *C. leuconyx*; but it has the tail forked to the depth of an inch.

Observations on the rate of Evaporation on the Open Sea ; with a description of an Instrument used for indicating its amount. By T. W. LAIDLEY, Esq.

It has often occurred to me, that a simple and convenient instrument for ascertaining the actual amount of exhalation from a humid surface, could not fail of being essentially serviceable to meteorological science, as well as to the arts. An instrument for this purpose was indeed contrived by the late Professor Leslie, to which he gave the name *Atmometer*: but though very ingenious, and fulfilling tolerably well the intentions of the inventor, it fails in a very important qualification of scientific instruments, simplicity of construction and use ; and is consequently less frequently employed in observing the condition of the atmosphere in reference to dryness and humidity than is desirable. The instrument is thus described by its inventor : " The *Atmometer* consists of a thin ball of porous earthenware, two or three inches in diameter, with a small neck, to which is firmly cemented a long and rather wide glass tube, bearing divisions, each of them corresponding to an internal annular section, equal to a film of liquid that would cover the outer surface of the ball to the thickness of the thousandth part of an inch. The divisions are marked by portions of quicksilver introduced, ascertained by a simple calculation, and they are numbered downwards to the extent of 100 to 200 ; to the top of the tube is fitted a brass cap, having a collar of leather, and which after the cavity has been filled with distilled water, is screwed tight. The outside of the ball being now wiped dry, the instrument is suspended out of doors, exposed to the free access of the air. In this state of action the humidity transudes through the porous substance just as fast as it evaporates from the external surface ; and this waste is measured by the corresponding descent of water in the stem. If the *Atmometer* had its ball perfectly screened from the agitation of the wind, its indications would be proportional to the dryness of the air at the lowered temperature of the humid surface ; and the quantity of evaporation every hour as expressed in thousand parts of an inch, would when multiplied by 20 give the hygrometric measure. The *Atmometer* is an instrument evidently of extensive application, and of great utility in practice. To ascertain with accuracy and readiness the quantity of evaporation from any

surface in a given time, is an important acquisition, not only in meteorology, but in agriculture and in the various arts and manufactures. The rate of exhalation from the surface of the ground is scarcely of less consequence than the fall of rain, and a knowledge of it might often direct the farmer advantageously in his operations. On the rapid dispersion of moisture depends the efficacy of drying houses, which are often constructed most unskilfully, or on very mistaken principles."

The instrument which I have found to answer extremely well, consists of a glass tube the bore of which must be equable, and may vary from one or two-tenths of an inch in diameter to a much larger size, according to the pleasure of the constructor. If the bore be not quite equable, its varying capacity must be ascertained and allowed for on the scale to which it is to be attached. One end of this tube, after being ground quite flat and smooth, is to be closed with a porous substance, which space permits the free transudation of water, but yet not so freely as to accumulate in drops or to fall. I find that common cedar wood possesses the requisite quality, and forms a plug which swells so as to become water-tight; and by its porous structure permits the fluid to permeate as rapidly as the atmosphere removes it from the exposed surface. The tube thus prepared, and filled with distilled water, is to be attached to a scale divided into fiftieths or hundredths of an inch, upon which as the evaporation proceeds and the column of fluid descends, the daily amount of evaporation may be conveniently observed. No other precaution seems necessary in using this *Atmometer* than to supply it with *very pure* rain or distilled water; for any saline matter it might contain would be deposited upon the evaporating surface, and would interfere very materially with the result. To prevent error from this source, the entire tube should be very frequently (say every time that it is filled,) washed in a quantity of clean water to remove accidental impurities; and the cedar plug occasionally renewed.

The following observations made with this instrument on board of the ship "Southampton," on her recent voyage from England to Calcutta, showing the rate of evaporation on the open sea in tropical latitudes, may not be altogether uninteresting to such as are curious in oceanic meteorology. The instrument was suspended in a shaded part of the vessel, exposed freely to the action of the wind.

		Latitude.	Longitude.	Barometer.	Thermometer.	Evaporation in inches.
		° /	° /		°	
October	3	37 15 S	40 31 E	29.90	62	0.40
	4	37 13	44 05	30.13	63	0.38
	5	37 19	47 50	30.10	64	0.51
	6	37 09	51 51	30.06	66	0.33
	7	36 38	56 14	30.08	56	0.40
	8	35 58	59 50	30.12	58	0.45
	9	35 39	62 21	30.16	61	0.40
	10	34 46	67 19	30.14	62	0.40
	11	33 24	71 47	30.02	63	0.41
	12	31 51	75 01	29.94	63	0.35
	13	30 27	79 05	30.09	66	0.38
	14	28 54	82 37	30.16	69 5	0.37
	15	26 14	84 25	30.18	71	0.39
	16	24 25	86 10	30.19	71.5	0.60
	17	23 02	86 14	30.24	72	0.62
	18	21 06	86 18	30.10	73	0.72
	19	18 25	86 34	30.11	76	0.68
	20	16 39	86 36	30.10	77.5	0.70
	21	14 42	86 54	30.11	81	0.70
	22	11 07	86 51	30.00	82	0.78
	23	7 39	86 54	30.09	84	0.80
	24	3 57	87 10	30.05	84.5	0.82
	25	2 08	87 19	30.04	83.5	0.75
	26	1 09 N	87 57	29.97	84	0.86
	27	4 19	89 32	30.00	82.5	0.98
	28	6 41	90 16	30.00	84	1.00
	29	7 58	90 40	30.00	84.5	1.06
	30	8 50	90 52	30.02	81.5	0.88
	31	9 35	90 40	30.00	84	0.72
November	1	10 55	90 15	30.00	84	0.93
	2	13 10	89 56	30.03	81	0.82
	3	14 15	90 00	30.05	86	0.40
	4	15 20	89 30	30.05	84	0.70
	5	17 25	88 49	30.00	83	0.67
	6	18 34	88 24	30.00	83	0.72
	7	18 52	88 45	30.02	83	0.68
	8	19 23	88 53	30.10	83	0.88
	9	19 18	89 37	30.00	82	1.15
	10	19 56	89 43	30.00	82	1.25
	11	20 37	89 00	30.00	81	1.24
	12	20 54	89 12	29.95	80	1.32
	13	Sandheads.		29.98	80	1.04

The reader will perhaps be surprised at this high rate of evaporation on the open sea, differing as it does so widely from that deduced by M. Von Humboldt from his own observations with the hair hygrometer. That accomplished observer gives the following results, calculated from a formula of M. d' Aubuisson, which does not however appear to meet all the circumstances of the case.

Latitude N.	Thermometer, (Cent. grade.)	Hygrometer.	Quantity of water evaporated per hour in millimetres.
° /		°	
39 10	14.5	82	0.13
30 36	20.0	85.7	0.14
29 18	20.0	83.8	0.16
18 53	21.2	81.5	0.20
16 19	22.5	88	0.13
12 34	24.0	89	0.13
10 46	25.4	90	0.12
11 1	25.0	92	0.09

“It follows from these researches,” says M. Von Humboldt, “that if the quantity of vapour which the air commonly contains in our middle latitudes, amounts to about three-quarters of the quantity necessary for its saturation, in the torrid zone this quantity is raised to nine-tenths. The exact ratio is from 0.78 to 0.88. It is this great humidity of the air under the tropics, which is the cause that the evaporation is less than we should have supposed it to be from the elevation of the temperature.”

These inferences seem scarcely compatible with the actual indications of my instrument. But it must be observed, that besides being imperfect as a hygroscope, De Luc's instrument takes no cognizance of the important agency of the wind in promoting evaporation. So far from diminishing, the exhalation from the surface of the sea would appear to augment very rapidly as we approach the torrid zone: my observations exhibiting a daily average of 0.398 in. from latitude 37° 15' S. to latitude 24° 25', and of 0.809 in. through the tropics.

On the Alpine Glacier, Iceberg, Diluvial and Wave Translation Theories ; with reference to the deposits of Southern India, its furrowed and striated Rocks, and Rock basins. By CAPTAIN NEWBOLD, M. N. I., F.R.S. Assist. Commissioner Kurnool, Madras Territory. With a plate.

The geological reader in looking over the published remarks of observers on the geology of Southern India, can hardly fail being struck with the almost utter absence of any notice of a boulder or drift formation, analogous to that which prevails to a great extent over the surface of the northern parts of Europe, and in the higher latitudes of the opposite hemisphere. Nor has any undoubted testimony been hitherto laid before the geological world as to the existence in Southern India of the polished surfaces of rocks, grooves, parallel striæ, perched blocks, truncated conical mounds, tumuli, and long ridges of gravel, which have been so conspicuously pointed to in Europe by Agassiz and others, as unquestionable evidences of the overland march of glaciers conveying boulders, gravel, sand, and loam to great distances.

Charpentier and Venetz were the first, I believe, to promulgate the theory—that ancient Alpine glaciers extended far beyond the present limits of glaciers from the Alps to the Jura, and were the means of conveying the gigantic angular granite and crystalline blocks of the former chain, to the strange position they now occupy on the limestone slopes of the latter ridge, over the intervening valley, which is one of the deepest in the world and upwards of 50 miles in width. To account for the extension of glaciers across this valley to the Jura, now entirely destitute of glaciers, M. Charpentier supposes the elevation of the Alps to have been much greater than now: and it appears certain that moraines, striæ, and furrows, considered to be indubitable marks of glacial action, can be traced in the Alps to great heights above the present glaciers, and to great horizontal distances beyond their lower limits. The Jura, which is only about one-third of the average height of the Alps, presents similar marks of glacial action to the Alps, although now entirely destitute of glaciers.

It was subsequently objected, that the phenomena of erratic boulders extend over the northern and more temperate zones of Europe, Asia and America, in flat tracts, and consequently could not be ac-

counted for by so local a cause as the former greater elevation of the Alps.

To explain these difficulties, M. Agassiz repudiates the former greater elevation theory; and supposes a former colder state of climate prevailing over the countries, in which the phenomena of boulders are found, and which covered them, as is now the case in Greenland, with sheets of ice and glaciers.

He supposes that most of the large longitudinal beds of unstratified gravel we see in the North and West of England, Scotland and Ireland, to be the lateral moraines, and the conical truncated mounds and insulated tumuli to be the terminal moraines of ancient glaciers, (left by their retreat, and not pushed forward by them as supposed by Charpentier,) broken and washed by *débâcles* occasioned by the thawing of the ice, masses of which were thus drifted in diverging directions, conveying the large insulated angular masses of rock called erratic blocks to the strange situations we now see them occupying.

Circles of such angular blocks seen round the summits of conical peaks are supposed to be occasioned by the glaciers lodging on it and melting on it. They are usually called perched blocks.

The rounded or bouldered blocks and gravel are supposed to have been produced by the trituration of the masses of ice and glaciers upon the subjacent surface, and the angular blocks which are found on the surface of the rounded materials, to have been left there by the melting of the ice. The interstratified deposits of mud, gravel and sand are considered to be a re-arrangement of the smaller materials of a moraine produced by the water resulting from the melting of a glacier. M. Agassiz observed polished surfaces, furrows, cavities, and striae in the rocks of England, &c. where the boulder formation exists, similar to those in the Alps, and considers them also as proofs of the former existence of glaciers in those now temperate regions.

The longitudinal furrows, &c. were observed by Seffström and others to have a general direction of N. W. and S. E. in the rocks of Lapland, Norway, and Sweden; which, added to the circumstance of blocks of granite confessedly from the mountains of Scandinavia being found imbedded in the boulder and drift of the eastern coast of England and Scotland, over Russia and Germany to the borders of Holland, and other reasons, induced many distinguished geologists to suppose the

boulder deposit to have been produced by a deluge, or great oceanic wave from the north. These parallel furrows were supposed to have been caused by the passage of gravel propelled by this great current, and hence called "diluvial schrammen."

Börlingk, however, has observed that some of these Scandinavian furrows have centres of dispersion (like those formed by modern glaciers on the Alps,) conformable to the major axis or longitudinal direction of each valley. In the south of Sweden, he says, the striæ incline southerly; but on the east of Lapland northerly to the Icy ocean; he states, the general direction of the striæ on the summits of Scandinavia to be from N. W. to S. E. Those also in North America observed by Professor Hitchcock, have a similar direction.

M. Agassiz repudiates this diluvial theory as applicable to the drift and parallel furrows on the rocks of England and Scotland, which he states to diverge every where from the central chains of the country, following the course of the vallies; and that the distribution of the blocks and gravel follows similar directions, each district often having its peculiar debris traceable in many instances to its parent rock at the head of the valley. Hence, he infers, the cause of the transport must be sought for in the centre of the mountain ranges, and not from a point without the district. The Scandinavian blocks in the drift of England, he confesses, may have been transported on floating ice.

M. Agassiz does not deny the power of water to produce the furrows, and polishing of rocks in *sitû*; but states he has not been able to find them on the borders of rivers, lakes, and on sea coasts; that the effects produced by water are sinuous furrows proportioned to the hardness of rocks; not even, uniform, polished surfaces, such as those presented by rocks acted upon by glaciers having both loose gravel under them, and pebbles and pieces of rock firmly set in their lower surface like teeth in a file, and which are independent of the composition of the stone: for, he states, wherever the moveable materials, which are pressed by the ice on rocks in *sitû*, are hardest, there occur independent of the polish, striæ more or less parallel in the general direction of the movement of the glaciers. Thus, in the neighbourhood of glaciers, are found those polished round bosses which Saussure distinguishes by the name of '*roches moutonnés*.' The most striking fea-

tures in the distribution of Alpine glacial striæ are thus diverging at the outlets of the vallies, and their being oblique and never horizontal on the flanks, which they would be, were they due to the agency of water, or floating masses of ice.

The cause of their obliquity M. Agassiz ascribes to the upward expansion of the ice by the freezing of the water infiltrated into the crevices and pores of the glaciers, and the descending motion of the glacier itself which he considers produced by this expansion of the mass and its gravitation.

From the resemblance in shape, and the interior arrangement of the beds of the so-called diluvium of England, France and Germany, that of the moraines confessedly produced by existing Alpine glaciers ; from the presence on these rocks of furrows, &c. resembling those now produced at the bottom of moving glaciers ; their radiation from mountain centres of elevation and coincidence of direction with that of the vallies down which glaciers would descend ; their obliquity just described, and from the existence on the Jura limestone of basin and funnel-shaped cavities, and small indentations similar to those seen forming at the bottom of glaciers by small and temporary cascades descending through cracks and chasms in the ice, and from the association in those regions of these Alpine phenomena, which M. Agassiz contends are inexplicable on any theory of aqueous action apart from ice ; he infers, as already stated, that very large portions of the now temperate regions of the globe have for a long period been covered with ice and snow.

A few shells of an arctic character, which have been found in the boulder deposits of Scotland and North America in addition to the above, constitute all the evidence we have of the period of intense cold, on which rests the Alpine glacial theory as applicable to the boulder deposits ; and which M. Agassiz ingeniously imagines, accounts for the extinction of the mammoths which flourished in the warm period immediately antecedent, and the appearance of their frozen remains in arctic glaciers. The frozen period was followed by the more temperate human epoch.

The views of M. Agassiz on the origin of the boulder deposit have met with powerful support from Dr. Buckland, and partially from Mr. Lyell.

Mr. Murchison, the late distinguished President of the Geological Society, and M. Vernenil, reject the Alpine glacial theory, considering it as totally inapplicable to the boulder formation overspreading great part of Russia; the large granitic and other crystalline blocks of which (previously alluded to) have attracted so much attention from the days of Pallas up to the present time. These blocks, which have all been evidently derived from the North, are shown to have been deposited *under the sea*, or in other words, *on a sea bottom*, since they cover marine shells of the post-pleiocene period. The smaller blocks of the detritus are in general carried to greater distances than the larger; the distance being sometimes 1000 miles from the parent beds to the N. W. As in the English deposits, although a large proportion consisted of material brought from a distance, yet it contained a considerable portion of the detritus of the subjacent and adjacent rocks, the nature of which was often indicated from the colour of the superficial clay and sand. Mr. Murchison and M. Vernenil observed *no instance of any substance having been transported from S. to N.* except by the modern action of streams, and by local causes dependent on the present configuration of the land.

In room then of the Alpine glacial theory these authors substitute that of Icebergs. *They believe that these great blocks have been transported on floating icebergs set adrift from ancient glaciers supposed to have existed in Lapland and the adjacent tracts; from the northern chains of which the blocks were originally dislodged and impelled southwards into the sea* of that period, in which the post-pleiocene shells they are now seen to rest upon were accumulated.

They did not observe any parallel striæ or polishing of the surfaces of the rocks of Central Russia, but describe the most southerly of the scratches which came under their notice near Petrazowodsk on the Lake Onega.

They consider these marks may have been caused *by the ice-floes and detritus dislodged and set in motion by the elevation of the northern continental masses, grating upon the bottom of the sea*; since, if they were caused by the *overland* march of glaciers, the glaciers must have been propelled from lower to higher levels, which is against what they conceive to be an axiom, viz., *that the advance of every modern glacier depends on the superior altitude of the ground behind it.*

Mr. Darwin's researches in the opposite hemisphere show, that the boulder formation, with all its European features, exists over extensive regions of South America; in the plains traversed by the Rio Santa Cruz (Lat. 50° S.); Tierra del Fuego,—including the Straits of Magellan and the Island of Chiloe (Lat. 43° S., Long. 73° W.) Mr. Darwin, in order to account for the interstratification of regular beds, the occasional appearance of stratification in the mass itself, the juxtaposition of rounded and angular fragments of various sizes and kinds of rock derived from distant mountains, and the frequent capping of gravel, follows Mr. Lyell in believing that floating ice charged with foreign matter has been the chief agent in its formation; but, he adds, it is difficult to understand how the first sediment was arranged in horizontal laminæ; and coarse shingle in beds; *while stratification is totally, and often suddenly, wanting in the closely neighbouring till*, if it be supposed that the materials were merely dropped from melting drift ice; and he is disposed to think that the absence of stratification, as well as the curious contortions described in some of the stratified masses, are mainly due to the disturbing action of the icebergs when grounded.

He believes also, that the total absence of organic remains in these deposits may be accounted for by the ploughing up of the bottom by stranded icebergs, and the impossibility of any animal existing on a soft bed of mud or stones under such circumstances. In conformation of the disturbing action of icebergs, Mr. Darwin refers to Wrangel's remarks on their effects off the coast of Siberia.

Professor Hitchcock, and more recently Mr. Lyell, have made us acquainted with the great extent of the boulder formation in North America accompanied by parallel striæ, and rounded and polished surfaces of the harder rocks in situ; also vast longitudinal mounds and detached tumuli of detritus. The prevailing direction of the striæ observed by the former, as before observed, assimilated to that of the furrows on the Scandinavian rocks, viz., from N. W. to S. E.

The advocates of the iceberg theory consider these ridges and mounds of unstratified gravel (the moraines of the glacialist) to have been the wreck of icebergs freighted with the detritus of circumpolar rocks, and stranded on the shores of seas, estuaries, or lakes; or as having been deposited in deep water by floating icebergs melting as they approached warmer seas. The interstratified deposit, and occasional

appearance of stratification in the mass itself is supposed to be occasioned by a re-arrangement of these materials by subsequent aqueous currents, which are also referred to as having given to the mass the configuration of longitudinal reefs, or truncated mounds.

It is well known, that the present general course of existing icebergs is from the polar regions towards the equator. These icy masses, as we glean from the writings of Scoresby and other navigators, are seen drifting in the open seas—laden with beds of rock and stone, brought from polar regions, the weight of which has been conjectured at from 50,000 to 100,000 tons, which are deposited as they dissolve either on the bed of the ocean, on the coasts, or when they ground. The breadth of one of these icebergs was about 15 miles.

A recent letter to Colonel Sabine from an Officer of the Antarctic expedition, states, that in Lat. 79° immense cliffs of ice were met with, forming the sea borders of an enormous glacier, above which, at a great many miles distance, the top of the mountains were visible. The ice-cliff was constantly breaking and tumbling down, and the disjointed masses congregated and floated away towards the equator to 60° S. Lat., where an enormous extent of iceberg was constantly to be found floating, and not fixed to any submarine ridge. Here they were constantly depositing by dissolution immense quantities of stones, earth, and other materials brought from the distant antarctic mountains. Still more recently, Mr. Hopkins the mathematician, supported by Professor Sedgwick, accounts for much of the drift on the flanks of the Cambrian chain without invoking the aid of glaciers or icebergs, by the hypothesis of the transporting forces of diverging waves of an ocean consequent to the elevation, or *paroxysms of elevation*, by which the mountains were raised from its bed. Such waves he terms "*waves of translation*," because they are found not to rise and fall like common waves, but wholly to rise, and maintain themselves above the level of the water. The powers of such waves have been reduced to laws by the experimental researches of Mr. Scott Russell, which prove that a sudden elevation of a solid mass from beneath the water causes a corresponding elevation of the surface of the fluid, which infallibly produces a *wave of translation* of the first order.

Arguing that this wave is propagated with a velocity which varies with the square root of the depth of the ocean, Mr. Russell determines

the velocity of wave transmission, and that the old idea of the power of waves extending only a little way down in the sea is not true as touching *waves of translation*,—the motion and power of which is *nearly as great at the bottom as at the top*.

He further demonstrates, that the motion of this wave does not fluctuate, but is continuous and forward during the entire transit of its length; hence a complete transposition is the result of its movement: and the wave of translation, he says, may be regarded as a mechanical agent for the transmission of power as complete and perfect as the lever or inclined plane.

Reasoning from such data, Mr. Hopkins states, that currents of 25 and 30 miles an hour may be easily accounted for, if repetitions of elevations from 160 to 200 feet be granted; and with motive powers producing a repetition of such waves he infers, from mathematical and mechanical arguments, that there would be no difficulty in transporting to great distances masses of rock of larger dimensions than any boulders in the north of England.

Mr. Hopkins has also shown by mathematical analysis, that the overland march of glaciers over large and flat continents is a theory founded on mechanical error, and involves conclusions irreconcilable with the deductions of collateral branches of physical science.

Such is a brief abstract, derived principally from the Geological Society's Proceedings of the theories which divide the geological world at home regarding the boulder formation. General Briggs, perceiving that India was silent, while Europe, part of Asia, and America in both hemispheres, were contributing to the general stock of knowledge on this head, applied to some of the local authorities in the East to lend their aid in eliciting information, and among others to the Marquis of Tweeddale and General Fraser, to whom I have already transmitted some memoranda on the subject, at their request.

On mature consideration, however, I am of opinion that the mode I have adopted, of publishing an abstract of the theories on the subject which agitate geologists, with a notice of the leading feature of the principal alluvial deposits of Southern India as far as hitherto known, followed by a short description of the characteristics of the true boulder formation, by which it may be recognized when found in Southern India, and a list of the chief points to which the observer's attention should be directed in gaining useful information on this head,

in language free, as far as possible, from scientific terms, will serve more effectually towards the carrying out General Briggs's views.

Existence of erratic Blocks and Boulders in Southern India.

It was Brongniart, I believe, on the authority of M. de la Luc, who first spread among the *Savans* of Europe the idea that the rounded blocks of granite around and in the vicinity of Hydrabad in the plains of the Deccan were true erratic boulders; but after a close and extended examination of them, and of the rocks for many miles around, I am convinced that these blocks are *in situ* (in place,) or nearly so, since they invariably rest upon, or near a granite of the same petrographical character; and that they owe their prevailing globular and rounded form to a process of spontaneous concentric exfoliation which I have endeavoured to explain in a paper published in the Journal of the Royal Asiatic Society for 1840.

The granite and limestone blocks at Puttuncherloo near Hydrabad, around Bangalore, Bellary, and in the Carnatic, wherever examined closely, I have found to be of precisely similar origin.

The formation in all these localities is one of granitic rocks, gneiss, and other contemporaneous crystalline schists, penetrated by dykes of basaltic greenstone, varying in structure from compact basalt to crystalline and porphyritic greenstone. The disposition of the last rock to assume a globular or spheroidal shape in weathering is still more remarkable than in the granite, which is often seen in rhomboidal and cuboidal masses, the angles of which are first blunted, and then rounded off by the exfoliation.

The Hydrabad granite blocks are seen lying singly, in confusedly piled heaps, or resting as tors or logging stones on bare bosses of a similar granite; and sometimes buried or half-buried in a soil formed by their own weathering.

At Lunjabunda, in the Kurnool district, I observed a single globular mass of granite about 18 feet in circumference, resting on a bare boss of the same rock, from which apparently the slightest touch would send it rolling to a considerable distance in the plain, and of which the subjoined diagram may serve to convey some idea. (*See plate, Diagram, No. I.*)

The globular block A, is cemented to the boss beneath it B, by a paste *a*, arising from the decomposition of the granite itself, a felspathic

clay hardened by the oxidized iron of the mica and hornblende. Now the block A, might either roll on to a gneiss, or any other crystalline schist at C, or become buried in the alluvion at D. It might be set in motion not only by a stroke of lightning or an earthquake, but by process of its own weathering or that of the boss beneath it, or the washing away by the rain of the cement. The distance to which it might roll would be in proportion to the height and inclination of the boss on which it rests, the slope of the plane at its base, and its own weight and roundness.

In some cases the very rocks from which these globular masses originated, and on which they rested, have weathered faster than the block itself, and have crumbled into the mounds of angular gravelly detritus so common over the whole granitic area of Southern India, known to native cultivators and well-diggers under the names of *Mhurram* and *Ghurru*, in contradistinction to the nodular limestone gravel called *Kunker*.

Amid this granitic gravel evidently formed in situ, in some places near 80 feet deep, are occasionally found the hardest spheroidal nuclei of granitic and basaltic rocks. These blocks have longer resisted the decay which has worn down the rock of which they once formed veins or dykes. Such is also the case in the angular gravel arising from the weathering of gneiss and the other crystalline schists, in which granitic and basaltic greenstone so extensively occur in the shape of dykes or veins.

That this gravel has not travelled far is evident from the angular nature of its component fragments, and that it is not the transported angular gravel of a moraine, or iceberg, is evident from the fact of veins of quartz, extending into it from the less weathered portions of the subjacent granite, or crystalline schists from which it is derived. The vein A A, in the diagram is of quartz, which though crumbling like white sand under the pressure of the fingers, is still seen to preserve its relative place and proper direction in the gravelly detritus above B, from the subjacent gneiss. (*See plate, Diagram, No. II.*)

Ovoidal fragments of granite sometimes occur imbedded in gneiss at considerable distances from any surface granite, which when exposed by the decay of the imbedding rock, might in an apparently exclusive gneiss area be difficult otherwise to account for than as a trans-

ported block ; however, wherever we find gneiss in Southern India, the granite is never far distant.

Dr. Benza is inclined to consider the blocks of granite seen scattered on the table-land of Mysore about Golcondapatnam, from the confused nature of their arrangements and the circumstance of no hills of any magnitude being apparent, as erratic boulders : but those which I examined in this locality proved to be out-croppings of granitic veins or dykes in the gneiss which bases this plain, deserted by the softer and more easily weathered imbedding schist. Granite and greenstone are abundant in the surrounding country ; and even when not apparent, its existence must always be suspected in the hypogene areas of Southern India. It must also be borne in mind, if ever granite blocks are found at great distances from the rock whence they were derived, that the surface of India, like that of other countries, has been subjected to waves of translation caused by elevation to the surface.

Insulated blocks, knobs, clusters of granite, like those in the gneiss and granite plains of Hydrabad, Mysore and the Carnatic, have never been observed on the surface of the extensive diamond limestone and sandstone patches of Cuddapah, Kurnool and the South Mahratta country :—and only one small fragment of the former rock on the granitic and hypogene areas, at the base of the Neilgherries by Dr. Benza, which alone cannot be pronounced with any certainty as a true boulder, or transported pebble, as it may have been dropped from the collection of a traveller.

It will be proper to observe, that the Hindus like the ancient Egyptians, in the construction of their temples and statues, manifest a partiality for granite and basalt ; blocks of which they will convey to great distances, if quarries should not happen to be at hand. I have seen a pagoda entirely built of granite amid the Moslem ruins of Bijapore, which is situated on a plain of the overlying trap 16 or 17 miles from the nearest granite rocks.

The Egyptians, who had the advantage of easy water carriage, transported enormous blocks of granite from the quarries of Syene to Lower Egypt. In the desert, as in the jungles of India, are frequently seen fragments of this rock scattered on the sands—the only remaining vestiges of former structures, and many miles distant from the parent rocks.

The tabular summits of the diamond sandstone and limestone in Southern India are often covered with rounded pebbles, which an examination always proved to be those loosened out of the sandstone pudding stones in weathering.

Diamond gravel. Beds of gravel, in which I have observed transported pebbles which could not be accounted for by causes now in action, occur in the valley of the Pennaur underlying a steep bed of *regur*, and in other diamond tracts. The diamond is found often as a transported pebble in this gravel; and pits are sunk through the *regur* to it. It is stratified, and bears more resemblance to the gravelly beach of a lake in the size of its pebbles, &c. than to the incongruous mass of a boulder bed. It rarely exceeds a couple of feet in thickness.

River terraces, &c. Along the courses of the great rivers of India, for instance that of the Bhima, are occasionally seen river terraces and beds of gravel beyond the highest present floods and inundations. Some of these may be owing to shifts in the course of the rivers themselves, but others indicate the passage of more extensive currents of water than at present.

Captain Allardyce informs me, that the Moyar valley, a mile or more in breadth at the base of the Neilgherries, bears evident marks of having been once the channel of a river, now only visible in an insignificant stream, which even in the monsoon does not occupy one-hundredth part of its breadth. There are beds of sand and gravel in the cross valley of Baugapilly, through which a rivulet cuts its way, which could never have deposited this gravel on the summit of the Ghauts. Captain Allardyce writes me, that traces of a diluvial current exist on the summit of the Neilgherries, upwards of 6,000 feet above the ocean's level; that the gravel and loam there are arranged in such a manner, as could only take place by deposit from water, the gravel being lowest, in a thin distinct and separate stratum, with the lighter loam covering it to the thickness of several feet.

Lateritic gravel. Beds of a red ferruginous gravel, principally derived from the true laterite, for which they have been mistaken, exist on the table-lands, near the flanks of the Ghauts and in the maritime plains at their bases; but none of them assimilate the character of the European boulder formation. Some of them are recent alluvia, but

others are evidently derived from the denudation the laterite has been subjected to during the elevation of the land.

Sand beds of Baroque underlying the Regur. Beds of a yellowish brown micaceous sand, I am told by Professor Orlebar, underlie the *regur* near Baroque, extending inland as far as Ahmednugger, in which no fossils have been found.

The Black clay of Coromandel. The cities of Madras and Pondicherry, and other places on the Coromandel Coast, stand on an alluvium which overlies beds of bluish black clay, interstratified with layers of sand and reddish clay. The surface black clay imbeds marine shells of existing species.

These beds sometimes extend several miles inland. The bluish black clay appears analogous to the *regur*, which will be described below. This accumulation of clays and sands it is probable extends with little intermission along the coast to the mouth of the Ganges, where they will be interrupted probably by the fluvial deposits of this mighty river. The delta of the Ganges, as far as we can gather from one boring experiment, consists at Calcutta of a series of dark clays and sands; they rest at the depth of 350 to 485 feet on a gravel composed of rolled pebbles of granitic crystalline rocks, similar to those described by Captain Cautley at the base of the Himalayas. The uppermost strata contained portions of peat, kunker, and fragments of trees, and the lowest beds, beneath a layer of dark carbonaceous clay under which were fragments of coal, fossilized portions of turtles, and the caudal vertebra supposed to be that of a Saurian. In the arenaceous beds above this, more than 200 feet from the surface, were found the lower half of a humerus, which Mr. Prinsep supposed to be like that of a dog, and a fragment of the carapace of a turtle. From the granite and gneiss gravel it has been inferred by Dr. McClelland, that bold mountains of these rocks existed in close proximity to the present site of Calcutta. The superimposed carbonaceous beds indicate a marshy surface clothed with vegetation, prior to which the currents which brought down the gravel, he thinks were arrested by the contemporaneous subsidence of the mountains and the lowering of the bed of the Ganges.

The Regur deposit. In a paper read before the Royal Society, several years ago, I have already endeavoured to show that the remarkable loam called Regur, is not a fluvial deposit, as supposed by

Voysey, nor a modern alluvium washed from the trap rocks as thought by Christie, but a deposit from water in a state of repose, or nearly so.

The principal objections to these theories of Voysey and Christie are,

1st. The great extent and geognostic position of the regur, covering both the tabular summits of hills, the bottoms of vallies, vast almost treeless plains, with a sea-like horizontality of surface, often far removed from the least influence of existing rivers and low floods. Its occurring in broad detached patches often far above the long, narrow lines of drainage.

2nd. Its underlying occasionally all present alluvial soils, those of the trap included, and filling up chinks and fissures in the subjacent rocks.

3rd. Its overlying granitic, hypogene, sandstone, limestone, and lateritic rocks indiscriminately, far distant from trap rocks which it also overlies.

4th. All trap rocks in weathering, redden by peroxidation of the protoxide of iron they contain ; and usually form first a brown, then a reddish-brown, or coffee-coloured soil.

5th. The regur, at a distance from trap rocks, imbeds no fragments of them, even of their hardest and most lasting vein stuff, such as quartz, jasper, heliotrope, agate, and calcedony. It often imbeds fragments of whatever rocks it may happen to overlie, or which are washed into it.

6th. The remarkable homogeneous character and colour of the regur over large areas, when free from recent foreign admixture, to which it is subject, as well as to re-arrangement from present rains and inundations.

7th. The different colour, generally shades of brown and red, of the present fluvatile deposits of Southern India, and their varying character over small spaces even.

In common with some clays of the boulder deposit, the stratification of the *regur* is rarely apparent, and always obscure. But this phenomenon I have observed in the mud of tanks over which the water has been deepest and stillest, and where the particles deposited were of a very fine and homogeneous character. In proportion as the nature of the mud deviated from these conditions, and became intermixed with silt and sand, the layers of deposition became more and more distinguishable.

This I also remarked to be the case with the mud of the Nile, particularly in the upper parts of its course through Egypt: but on the Delta where the slope of the bed is still less, and the motion of the stream languid, the stratification is more obscure.

Both in the mud of the Nile, and in that of the tanks of India where annual layers of deposition may be strongly marked, the layers of monthly, weekly or daily deposition are indistinct or not to be traced; hence the interior of the annual layer individually has an unstratified appearance. The same is observable in the structure of some individual beds of enormous thickness, as in the thick-bedded sandstones, in which, if the particles are of a homogeneous nature, stratification is hardly visible even on the face of cliffs 200 or 300 feet high.

It is possible that the *regur*, which is often thirty feet thick, from its generally unstratified aspect and homogeneous character—containing no interstratified layers of sand or pebbles, was the result of one period of deposition. In areas where stratification is said to be more distinct, for instance in Baroche, the deposit has probably undergone re-arrangement by subsequent currents. It is just such a deposit as might be expected to result from deep waters charged with the debris both mineral and vegetable of a submerged continent, the coarser and heavier fragments of which, as well as the silts and sand, had been deposited or left behind by the slowly retarding current. At length, as the waters gradually gained their level, the turbid fluid, now charged with nothing but the very finest and lightest particles, would move so slowly as to admit of their gradually sinking and being deposited on its bed. Above the first cataract and in Upper Egypt, where the current is more rapid, the deposit is usually of a coarse, and more silty nature than in Lower Egypt and on the Delta, and not of so carbonaceous a nature. Many of the finest particles are never deposited at all by the Nile in Egypt, but are carried out with its waters, and discolour the Mediterranean upwards of 70 miles from its embouchure. The sea water from its great specific gravity adds to the obstacles against deposition. The deposit of the Nile in some parts, as well as those of some tanks in India, not only resembles the *regur* in external appearance and colour, but also in chemical character. All three contain a considerable portion of vegetable matter.

In colour, extent, and position, the *regur* resembles the Tchórnoi Zem covering the plains of Russia; and in apparent want of stratification that fine yellowish-grey loam called Loess, which covers great part of the basin of the Rhine in beds sometimes 300 feet thick. The *regur*, however, contains no fossils except such present fresh-water and terrestrial shells as are washed into it. If we suppose the *regur* to be the deposit of annual inundations from ancient glaciers (which Mr. Lyell takes to be the origin of the Loess) charged with the impalpable mud of their moraines, we must examine the Ghauts and Vindhya, or even the Himalayas below the influence of present glaciers, for the usual signs of glacial action. The soil now washed down from these mountains, I need hardly observe is reddish and sandy, very different from the deep black or bluish black *regur*: but this difficulty may be perhaps got over by supposing the vast forests which clothed them during the warm ante-glacial period to have perished with the mammoths they shaded, and to have been ground down by glacial action with the felspathic, silicious, calcareous, and ferruginous particles of the subjacent rocks.

If we suppose it to be a deposit from former great inland lakes, in most cases we shall have to raise up rock barriers, not now in existence, to separate them from the sea and the adjacent lower lands, to sink them again; and, in fact, to change the entire physical configuration of the country. If it be considered a deposit thrown down on a sea bottom from melted icebergs, we ought to see in it large angular fragments of distant rocks, which no observations as yet show to be the case.

The non-fossiliferous character of the *regur* is common to the mud of the Nile, and may be regarded as indicative of the great trituration the debris composing it has undergone; and probably that chemical and other causes have combined to prevent fossilization in this soft mud.

Rock-basins. Rock-basins, the giant's caldrons of the Swedes, are seen occasionally on the summits of table-lands in Southern India, as for instance near the Kurnool frontier, with Baugapilly, and in other localities both in granitic and hypogenic rocks, and in the diamond sandstone and limestone in situations above the present action of running water; but when we see them in the fact of being excavated by water alone in the rocky beds of the principal rivers of India during these periodical rises and falls—conditions favourable to their production—

there appears no necessity for introducing the action of glaciers to account for their presence, which I have explained in detail elsewhere.*

Furrows and parallel Striæ. On and near the tops of the diamond limestone ranges of Pycut Puspulah, and Yairypilly—not far from the granite junction near Gooty, I have seen the surface of the rock traversed by furrows, having a common direction of N. by E., resembling those attributed to the action of glaciers; but in Europe even, where these marks are so numerous, the opinions regarding their origin have been latterly so conflicting, that their unsupported testimony may be regarded as much in favour of the diluvialist or of the advocate of the waves of translation, as of the glacialist and icebergian.

I have since had opportunities of carefully examining the grooves which cover the surfaces of the diamond limestone rocks near the caves of Billa Soorgum, Kurnool frontier, and on the summits of the hills between Dhone and Yeldroog in the Bellary district.

The limestone slabs in these localities dip slightly towards the east, and are in some places completely scored with furrows, which observe a parallelism over confined spaces. These furrows vary from the size of a goose quill in diameter to two inches, and are often separated by scabrous sharp edged ridges. They are often traversed by others at oblique and right angles so close together that the dividing ridges are cut up into a number of pointed cones, or pyramids.

It is quite evident from the sharpness of the edges and points of the ridges, that the grooves were not formed by the passage of gravel moved under the enormous weight of a glacier. The interior of the furrows has frequently to the eye a smooth apparently water-worn surface; but if the point of the finger be moved gently along the bottom, it will often be found to undulate. These undulations have been caused evidently by the wearing down of the lips which formerly separated the now continuous trough into a chain of oval or spheroidal cavities exactly resembling in miniature the chains of rock basins worn in the granite and gneiss of the Toombuddra.

Like them the majority of these furrows are attributable to watery erosion. They occur usually on the lines of almost imperceptible fissures in the rock-like vallies of erosion thus. (*See Plate, No. III.*)

* Vide Proceedings of Geological Society, 1841-2.

They not only traverse the upper horizontal surface of the strata, but sometimes continue over the edges down their vertical extremity or sides, which is attributable to the action of water slowly trickling over the edge, and not propelled beyond the edge to a distance from the vertical side, as is the case in a cascade.

The water, in many instances, seems to have acted corrosively as well as erosively on the substance of the limestone; for in examining some rain water, which had lodged in one of the eroded cavities, I found it held a considerable quantity of lime in solution. Carbonic acid might have been supplied from atmospheric exposure or from the surrounding dense vegetation, which the rains refresh. The solvent power of water too in tropical climates is considerably enhanced, not only by the increased temperature of the water itself, but by expansive action of the sun's rays on the atoms composing the rock-bare surfaces, some of which I have found often heated to 130° . The solid layers of schist are free from such furrows, but have a scabrous water-worn appearance, as if the limestone had been washed away.

Any pre-existing cavity in the surface of the rock forming a lodgement for the water, assists in the erosion of hollows. Strings of iron pyrites frequently drop out in weathering, leaving a chain of oval cavities, which the water soon works down into a continuous furrow. Others commence in the perforations of lithodomous molluscs, or those of existing snails which apparently by the chemical action of their juices take up the lime necessary for their house and food, and are found in numbers adhering to the surfaces and sides of the limestone.

It is evident, however, that some of the furrows were scooped out prior to the last displacements of the rock strata, as they partake of the faults and dislocations; and it is probable they were formed during the elevation of the land by sea water, as it is well known that sea water by the decomposition of its muriates and sulphates produces furrows and wrinkles on the surface of limestone, particularly near the water's edges, and subsequent rains have no doubt acted in extending and modifying them. The entire absence or great comparative rarity of such furrows on the surface of the associated sandstone, may be regarded as a further indication of the chemical action of the water in producing the furrows on the limestone.

In some places on the sides of the hills, the ends of the limestone beds protrude in steps about a foot high, down which the rain water has evidently flowed in a series of miniature cascades, which have hollowed out on the slabs below little cavities, and depressions not unlike the *lapiaz* of the Alps, marked by *a a* in the subjoined section-diagram. (*Plate, Diagram, No. IV.*)

Variolated surfaces. The surface of some slabs exposed to the air I observed to be perfectly variolated with *circular*, shallow cavities, caused by the dropping out of *cubic* crystals of iron pyrites. These crystals may be seen in every stage of decomposition,—first tarnishing, and losing their bright metallic lustre; next passing into a bronze-coloured hue: they then become liver-coloured, and lastly pass into a loose rust-coloured dust. At this stage, the limestone becomes stained by the rust nearly in semi-circles, marked *a a a a*, on each side of the crystal marked *b*, in the Diagram *b*, representing the decomposing crystal of pyrites. (*Plate, Diagram, No. V.*)

In the next stage, the angles between *a a a a*, become discoloured, and the whole stain takes a circular form; then the centre occupied by the crystal drops out, and finally the whole circular space, occupied by the rust-coloured stain.

Mark of ancient rains. Surfaces of rock variolated with such cavities must not be set down as having been indented by an “antediluvian shower,” though marks exactly similar to those supposed to be the effects of ancient rains exist on slabs below the surface covered by other layers, the lower planes of which exhibit the casts of these impressions.

Ripple marks. Ripple marks are seen in similar situations to the rain-drop impressions, but are much more frequent in the associated sandstone.

Striæ and Furrows on granite and gneiss. Striæ and furrows on granite, gneiss, &c. in situations beyond the reach of present aqueous causes are rare, and, from their conforming to the hard and softer parts of the rock, cannot be set down as marks of glacial action. These rocks, as before observed, are much subject to exfoliation by atmospheric exposure; consequently ancient marks, if they did exist, are liable to early obliteration on the air-exposed surfaces of such rocks.

Concluding observations. In reviewing all these deposits I can trace nothing analogous to the true boulder deposit, or to the action of glaciers, in the marks and furrows of the rocks just described. There is nothing which cannot be explained by existing causes, or by the supposition of the action of water during the oscillations which, there can be no doubt, the face of India has undergone.

The power of the wave of translation is written in large characters of denudation over its entire surface; or they stand out in bold relief in the bare dykes and naked clustered masses of basaltic greenstone and granite, and also in the harder beds and veins, which we see every where abruptly projecting, like the trap of the Wrekin in Shropshire, from the softer abraded strata around. It is visible in some of the larger gravels, and in the isolated horizontal beds of sandstone and laterite capping hills separated by denuded vallies and plains.

To the gentler effects of the waters retiring as the land gradually emerged from beneath, aided by minor oscillations, may be attributed the former wider channels of the rivers—the river terraces, the inland marine clays and sands on the coast of Coromandel, indicating former estuaries, and coast lines and inlets, now dry land; beds of gravel and loam in the interior; furrows and rock basins beyond the reach of existing aqueous causes, and ancient marl-bottomed lakes now desiccated, the existence of which is now only indicated by fossil lacustrine deposits, for instance, those of Nirmul.

The agency of floating ice in conveying the granite blocks we see imbedded in the mud and gravel of the east coast of England, from the mountains of Scandinavia across the intervening seas, is now pretty generally admitted.

One remarkable feature of the boulder formation still remains to be noticed, viz., its extreme rarity in warm latitudes, and its great prevalence in the cold and temperate regions of both hemispheres. In the northern hemisphere we behold it stretching from the icy regions of Scandinavia to about 55°, and overspreading part of North America; and in the Southern world it has been traced, with precisely the same features as in Europe, in Chili and Patagonia, between 41° South and Cape Horn.

This fact is considered by Mr. Lyell to be in favour of the iceberg theory, since the masses of drifting ice in approaching warmer latitudes would melt from the warmth of the sea and the action of the sun's rays on their sides and surface, and discharge their rocky freight long before reaching the equator.

The absence of the boulder formation in Southern India would add weight to this supposition; but until it has been more thoroughly searched for, we must not jump to this conclusion. Its comparative rarity, however, from the evidence even at present before us, cannot be doubted. I have sought for this formation, and also the old Silurian beds in countries yet nearer the equator, in the Malay peninsula, but in vain:—also on the southern and eastern coasts of the Mediterranean, the Red Sea, Egypt, the southern parts of Asia Minor, and the Peninsula of Sinai; but with similar success.

To support both the glacial and iceberg theories a period of intense cold in regions where a temperate climate now prevails, is supposed, as before stated, to have existed at a period between the extinction of mammoths and the creation of man. This cold, it is natural to imagine, would influence more or less the climate of countries nearer the equator, and among the rest that of Southern India; but as yet proofs of this decrease of temperature in the latter, either by the existence of the fossil fauna of more temperate or colder zones, the marks of ancient glaciers, or by other physical facts, are a desideratum.

For recent marks of glacial action, the Himalayas afford perhaps the best examples nearest the equator, and should be examined with care for ancient moraines, and other indications of a former greater extension of the ice and snow which now cover portions of the peaks and sides. If they be found, the next step will be to ascertain whether such extension of ice is ascribable to a former general decreased temperature of the surface as it now exists, or from a former state of greater elevation of these mountains. It has lately been argued, from the circumstance of fossil animals of warm climates having been found in tertiary Himalayan deposits now above the line of snow, that the Himalayas must have been elevated about 10,000 feet since the extinction of these races. It is, however, possible that dur-

ing the warm climates of the tertiary period these animals may have existed at the heights at which they are now found, or even at greater elevations. The geologist will do well, while marking the scale of former glacial extent in these instructive regions, to note also the nearest approach, habitual or casual, to the snow line of the subtropical animals at its base. The monkey and tiger have been observed close to it, and the elephant at no very great distance— 31° N. lat. 4000 feet above the sea. Tropical perennials are blended with a flora almost alpine, and the palm and the pine are seen in juxtaposition.

The sub-Himalayan gravel beds entombing the remains of the sivatherium, mastodon, elephant, rhinoceros, hippopotamus, &c., and the mastodon beds in the valley of the Nerbudda, are all stratified, and belong apparently to the tertiary period immediately antecedent to the supposed cold epoch of the boulder formation. (Vide concluding page at the end of *Desiderata*.)

India, stretching down from its vast icy barrier on the north to the verge of the equator, presents a wide field for physical observation; a thousand-times-told fact, but one which should never be lost sight of. Its surface has been but partially examined, and many large tracts wholly unexplored by the geologist. A few years only have rolled on since the great mammals in its deposits, just alluded to, were brought to light by the vigorous researches of Captains Cautley, Durand, Baker, and Doctors Falconer and Spilsbury; and still more recently it has been proved by the splendid fossil discoveries of Messrs. Kaye and Cunliffe in the limestone beds of Pondicherry and Verdachellum, that the cretaceous sea extended over the surface of at least part of Southern India. Major Franklin has referred the diamond sandstone and limestone to the Oolite and Lias, though at present they cannot be satisfactorily classed with these rocks until further fossil evidence be obtained.

The scantiness of these beds—the utter absence of the new red sandstone, magnesian limestone, and other aqueous deposits so abundant in northern zones, has been long subject of enquiry. The Silurian strata are also entirely wanting, and appear to thin out like the boulder formation as the equator is approached; although the temperature of the Palæozoic seas, if we may judge from the number of their corals, must have been like that of the carboniferous period, warm. I am

not aware, that the Silurian strata extend in Europe further south than the vicinity of Constantinople.

Are we to infer that these enormously thick aqueous deposits, abounding in the remains of marine creatures of strange and unknown aspect, since the appearance of which whole generations of others equally strange have replaced them and been obliterated in turn from the face of creation, *have* existed on the granites and trap of India, but have since been swept off by waves of denudation: or must we suppose, that these old fossiliferous rocks never had existence in Southern India and tropical countries, from the peculiar chemical conditions, or temperature of the seas which then covered them? Or, that the surface of these tropical regions was above the water at the time these deposits were going on in the then warm coral-producing seas around the arctic zone?

It may be also advanced, that the hypogene or crystalline rocks, which prevail so much in Southern India, are nothing less than the metamorphic fossiliferous strata of these periods. It must, however, be objected against this theory, that no fossil has ever been found in them, even at great distance from granite or apparent Plutonic action.

It has already been inferred, from the rarity or absence of the boulder formation in Southern India and other tropical and subtropical countries, that these regions enjoyed a warm climate during the frozen period which M. Agassiz assigns to now temperate climes during the boulder epoch. As there is no evidence of the climate of the former regions during the Silurian period, or of the then chemical condition of thier seas, it will be advisable, until better information be elicited, to refer the absence and the rarity of the older fossiliferous groups of Europe to the hypothesis of partial or entire elevation during such periods. Of denudation there is ample proof in subsequent periods, as before stated. We search in vain (the chalky spots near Pondicherry, Verdachellum, and a few other marine patches—isolated, yet significant monuments—excepted,) for remnants of these former fossiliferous coverings. I have not been able to trace a pebble from their detritus in any of the conglomerates, breccias, or gravel beds which now exist on its surface. If such beds ever did occupy the surface, their wreck for the most part must now lie in the bed of the ocean.

If Southern India was above the ocean during the deposition of the Silurian rocks, and other fossiliferous strata, of which no remains now exist on its surface, it must have subsequently undergone oscillations by which portions, or the entire mass, including the tract occupied by its grand physical feature, the Western Ghauts, were submerged, and again elevated to their present position with the laterite which, there is every reason to believe, belongs to the tertiary epoch. That at least a portion of Southern India must have been a sea-bed during the cretaceous period, has already been shown.

Some of the points latterly touched upon in this paper involve, it will be perceived, the highest and most interesting problems in physical geology, which cannot be solved until much more evidence be accumulated regarding the geology and former physical phases of tropical and sub-tropical zones. It has been ascertained beyond doubt, that the seas of ancient periods formerly covered a far greater extent of what is now land in the northern hemisphere, and the contemporaneous and much greater relative prevalence of land within or near the tropics is supposed, in order to account for the higher temperature which, it is evident, then prevailed in northern regions; but the present decrease of which is accounted for by Sir John Herschel on astronomical grounds, viz., that the *mean* amount of solar radiation is dependent on the eccentricity of the earth's orbit, that this eccentricity is, as has been for ages, actually on the decrease; and with it the annual average of solar heat radiated to the earth's surface.

Desiderata on the Boulder formation. In the hope of eliciting information touching the occurrence of the boulder formation in India, (and how much might be obtained even from persons entirely ignorant of geology now crossing India in every direction,) I have drawn up a few plain directions by which the true boulder formation may be readily distinguished from the ordinary gravels and alluvia of the country; and have added a list of the principal points on which information is required.

Sir John Herschel has well observed, "What benefits has not geology reaped from the activity of industrious individuals who, setting aside all theoretical views, have been content to exercise the use-

ful and entertaining occupation of collecting specimens from the countries they visit." This observation applies particularly to India—the geology of which is so little known—where, it is true, there are no professed geologists attached to our surveys; but where every individual has the means and ability of adding his mite to the general stock of knowledge, without any serious encroachment on his duties or his pleasures. "Even those who run may read" in the great open book of Nature; and if they read, there is no reason why they should not note, for the benefit of those who have not the opportunity of studying, the same pages.*

Boulders and erratic Blocks. The term "boulder" has been often misapplied to any loose rounded block of rock lying on a plain, or elsewhere on rocks, or the soil of rocks, of which it originally formed part. This is not a "boulder" in the geological acceptance of the term, the block being *in situ*; or not distant from the rocks of which it once formed part. A true boulder is a mass of rock, the corners of which have been rounded, from the size of a man's head to that of a field-officer's tent or a small bungalow, found detached and *at a distance* from the parent rock of which it once formed part, and resting on rocks generally of a *different nature*, or imbedded in gravel, clay, or loam.

Erratic blocks are fragments of rock, with sharp or little blunted corners, found in similar situations as boulders, or what is termed not "*in situ*," or transported from their native beds. Among the most remarkable erratic blocks in the world are the angular blocks of granite and gneiss, some as large as a Swiss cottage, which rest on the limestone rocks of the Jura. Now the nearest granite and gneiss rocks are those of the Alps, from which it is certain those blocks have been derived, although the great and deep valley of Switzerland, upwards of 50 miles broad, separates the two ranges.

* While Captain Newbold was writing this forcible passage at Kurnool, Lieutenant Sherwill was forwarding to the Society from Behar the splendid map and collection of specimens which we noted in our Proceedings of January 1845, and which the Society has most properly brought to the special notice of Government. It is impossible to give a better illustration of the truth of these remarks.—Eds.

A block of mica schist, weighing upwards of eight tons, lies on the top of the Pentland hills, 1000 feet above the sea, 50 miles from the nearest mountains of mica schist.

When loose, round, or angular masses of rock are seen on the surface, or imbedded in loam, clay or gravel, the nature of the rock and that of the subjacent and adjacent rocks should be compared. If they are similar, it will be difficult to prove the masses true boulders. If different, the bearing and distance of the nearest similar rocks should be ascertained, and the nature of the intervening ground described whether intersected by valley, hill or stream, &c. In all cases, specimens about two inches square or more of the blocks, the adjacent and subjacent rocks, and of those from which they are supposed to have been derived, should be broken off, and wrapped up in strong paper and carefully marked.

If it be certain that they are *boulders*, or erratic blocks, and not "*in situ*," their size and shape and number should be described, drawings made, the arrangement and longitudinal direction of the blocks, their bearings by compass, the height above the sea if possible, a description of the physical features of the locality and surrounding country. When circles of blocks are found round the tops of hills or other projecting points of the surface, care should be taken not to confound the old cairn-like mounds, circular burial places, old sheepfolds, remains of forts, or other old enclosures scattered over India, for the circles called "perched blocks."

The old inhabitants and watchmen (Taliaries) of the nearest village, should be carefully questioned on such points.

When erratic blocks can be traced to the parent rocks, it should be carefully noted whether they gradually increase in size as the rocks whence they were transported are approached.

Gravels, Clays, and Sands of the Boulder formation. The boulder formations of England, (called "Till" in Scotland,) of the north of Europe and America, and also that in the opposite hemisphere, are—1st, characterized, principally, by their generally unstratified character; 2nd, by imbedding both large and small, angular and rounded fragments of rocks of all ages in juxtaposition, confusedly jumbled together without reference to the laws of gravitation

or aqueous deposition, which are often reversed in the boulder gravels and the heaviest fragments found uppermost ; 3rdly, the great rarity of fossils. A few marine shells of an arctic character and the remains of a mammoth have been found in the *till* of Ayrshire ; arctic marine shells in that of North America ; and I have observed marine shells of recent species in that of Cheshire.

The boulder formation, in short, consists of usually unstratified accumulations of clay, loam, silt, sand or gravel, often 100 feet thick, imbedding sometimes great fragments of rock several yards in diameter, torn in many instances from rocks, hundreds of miles distant, separated by vallies, rivers, and even seas, as is the case in the drift on the east coast of England, which imbeds granite blocks from the mountains of Scandinavia. These deposits are sometimes capped by stratified layers of sand and gravel, and occasionally contain marks of stratification themselves.

The observer having, by these marks, ascertained that he has a boulder deposit before him, should note its general shape, direction and dimensions. If it occurs in detached truncated mounds, or tumuli like the terminal moraine of a glacier ? or like lateral moraines, in longitudinal ridges with a double talus ? the continuity and parallelism at the same height which is supposed to distinguish the lateral moraine of a glacier, from the debris disposed along the bottoms of the vallies by currents ? The thickness and extent of the gravel, sand, clay or loam composing the deposit, should also be noted ; the nature of the beds it rests upon, and also of those above it ; of all which specimens should be sent, as well as of the curious pebbles, sands, clays, &c. of the boulder deposit. It also should be noted whether the stratified portions of the boulder clays or gravels be bent up or contorted, as if by lateral pressure ; and whether the subjacent beds have been conformably or similarly disturbed.

The relative proportions of the pebbles of various sorts of rocks composing the gravel, their relative size, degree of attrition or roundness, should be ascertained ; and the different sites whence originally washed, searched for in the vicinity.

The gravel, clays, mud and loam should be examined for fossils ; and the condition of the latter, whether broken, water-worn or entire, and in good preservation, noted.

Furrows, striated and polished surfaces. The sides and surfaces of exposed planes, bosses, boulders, erratic blocks and masses of rock in situ, should be examined for polishings, striæ, or furrows, more particularly the surfaces of rocks which are protected by a covering of soil or turf, which it will be necessary to remove for this purpose. It must be noted whether the striæ and furrows are parallel or otherwise; whether oblique or horizontal, and their general direction. If in a valley, whether they run in the same direction as the valley, and diverge from it at the outlet.

Whether they run in *right lines, with even, uniform polished surfaces, or are shallower or deeper, varying according to the different degrees of hardness or softness of the different portions, and veins of the rock, and whether their course is at all sinuous.* "Slickensides" or the polished and striated surfaces of walls of fissured rocks and vaults caused by their friction in dislocation, must not be confounded with the marks of general or aqueous action.

The observer should endeavour on the spot to ascertain the possibility, or impossibility, by the supposition of present floods, rains, landslips, or other causes now in existence, of explaining these depositions, furrows, &c.; and also of the circular, oval, and spoon-shaped cavities, with smooth sides in rocks, termed rock-basins, which are often united by shallow gutters. It should be ascertained whether they are or are not within the reach of the highest inundations, or temporary petty cascades caused by monsoon rains, the periodical risings and fallings of rivers; whether empty or containing sand, or pebble; the nature of the pebbles, the dimensions and shape of the cavities, and nature of the surrounding ground.

Engineers, surveyors, and other servants of Government stationed in districts, will have time to note on all these desiderata as affecting their particular district; but it will be sufficient for men who travel rapidly from station to station, or on the line of march, to bear in mind that the great points to ascertain are—whether the blocks and gravel they see are composed of the adjacent and subjacent rocks or not, their distance from their native beds; to send specimens of all: and to see that the blocks and marks on the rocks are above the influence of present water-courses, inundations, and rains.

Since writing the above, I have perused Captain Herbert's valuable report on the Himmalayas, so properly rescued from oblivion, and so handsomely presented to the subscribers to the Journal of the Asiatic Society by Mr. Torrens, and find that the author notices deposits of unstratified gravel and sand, including boulders some of three feet in diameter, occurring in these vallies; and also along their base in a vast accumulation 192 miles long, nearly 10 broad, and sometimes upwards of 150 feet thick, and which, from being inexplicable by the supposition of existing floods and streams, he calls *diluvium*.

From his description, it seems to me probable, that some of these deposits and their attendant phenomena have been caused by the action of glaciers and debacles, the result of their melting.

The whole of them, and the *Tals* or lakes upon them, are well worth separate and extended investigation; and diligent search should be made on the rocks of the sides, surfaces, and outlets of the vallies, for the other supposed marks of glacial action just enumerated, and of which Captain Herbert has given us no information.

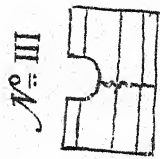
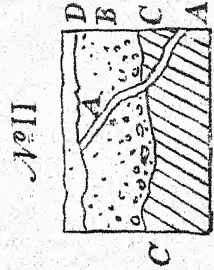
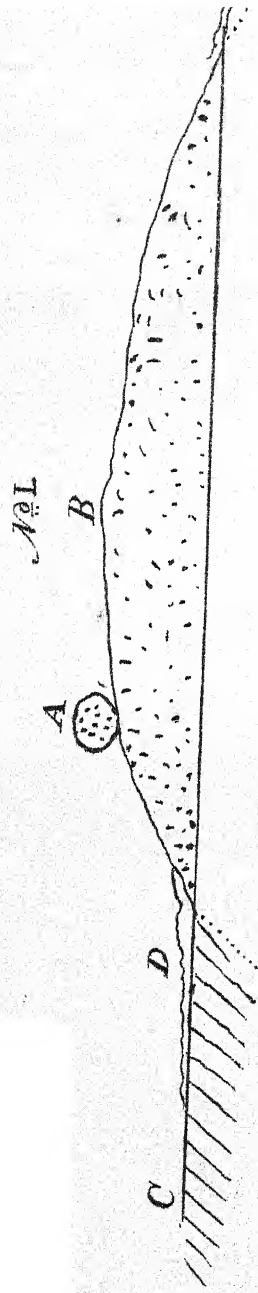
Among other promising localities may be enumerated the great transverse *Doons*, or vomitories of drainage, through which flow the Ganges, Sutlej and Jumna, the Ramgunga and the Gaggur, from their bases of glaciers; the mouths and sides of the glens opening into them; the vallies of the Burrul and Dhaolee, and of the Pubbur near Massoollea.

The immense bed of gravel and masses of rock called the *Bhabur*, which stretches along the base of the mountains, succeeded at its southern base by the remarkable terrace called the *Terrai*, both cut transversely through by present river channels; and the level-surfaced gravel and sand deposits locally termed *Khadirs*, through which many of the streams run, may be particularly pointed out as subjects for detailed information. Some of the mountain-streams are engulfed, according to Captain Herbert, in the gravels of the *Bhabur*; but probably reappear in the line of springs visible at its junction with the step of the *Terrai* which, from its striking moistness compared with the dry absorbent surface of the *Bhabur*, is probably a bed of some impervious substance, such as clay.*

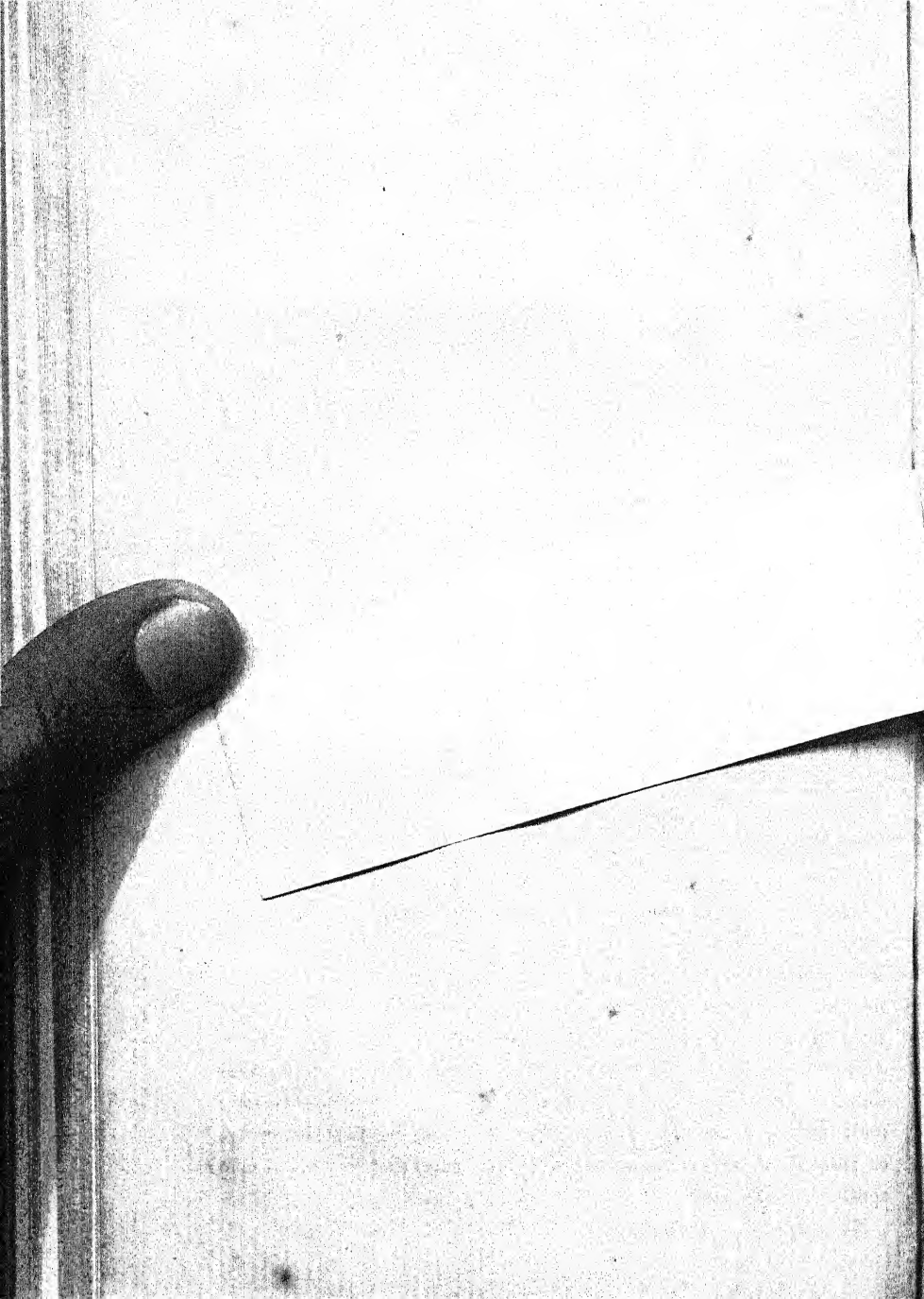
* See Mr. Batten's valuable observations on the Terrai of Rohilcund and Kemaon, Journal, Vol. XIII, p. 887.

Outside of this so-called tract of diluvium, Captain Herbert mentions a red earthy marl, with patches of sand and a blue clay, the relations of which with the unstratified gravels should be minutely described, and every search made in them for fossils. The black and blue clays may possibly bear some affinity to the *regur* in mineral composition.

I have not been able to consult Professor Royle's admirable work on the Himmalaya, or Dr. M'Clelland's valuable geological observations, in the remote part of India where I now write; but cannot conclude this list of *Desiderata* without strongly recommending their perusal to the observer travelling through or located in the interesting districts of which they treat.



Diagrams to Cap^t. Newbold's Paper



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ASIATIC SOCIETY.

Description of CAPROLAGUS, a new Genus of Leporine Mammalia.

By E. BLYTH, Curator of the Asiatic Society's Museum.—With two plates.

In the 'Bengal Sporting Magazine,' for August 1843, p. 131, Mr. Pearson has described an animal by the name *Lepus hispidus*, which I have long been very desirous of examining, and have sought to procure by every opportunity that has offered; and the Society has at length been favored with a fine specimen of it by our esteemed correspondent and contributor, Major Jenkins, Political Agent in Assam, to whose kind exertions in procuring this and other desiderata for the Museum, our thanks cannot be too often repeated.

As I fully expected, this animal has proved to be not satisfactorily admissible into *Lepus*, as the limits of generic divisions are now currently accepted; but must be regarded as a third generic type of the *Leporina*, Waterhouse; or rather, it is a very strongly marked modification of the *Lepus* subtype, and not so distinct a form (equivalent to *Lepus*,) as is that of *Lagomys*. In all its more essential characters it is akin to *Lepus*, but exhibiting very considerable modification in the various details of its structure. The head is large, the eyes small, the whiskers slight and inconspicuous; the ears are comparatively very short; tail the same; limbs small, and much less unequal than in *Lepus*; and the claws are particularly strong, straight, and very sharp-pointed, being obviously of important use in the creature's economy: lastly, the fur is very remarkable for an animal of the Leporine group, on account of its harshness, which is well expressed by the specific appellation *hispidus*.

The skull is much more solid and strong than in any *Lepus*, with every modification that should contribute to increased strength, but upon the same subtypical model of conformation; dentition also similar, but the grinders broader and more powerful, and the incisors and rodential tusks proportionally much larger: the palatal foramina are reduced so that the bony palate is as long as broad; the ant-orbital foramina are nearly closed by obliquely transverse bony spiculæ, corresponding to the open bony network observable in *Lepus*; the nasal bones are broad, with an evenly arched transverse section, and are less elongated backward than in the true Hares,—the maxillaries and intermaxillaries corresponding in their greater width and solidity; zygoma also fully twice as strong as in *Lepus*; the super-orbital processes continued forward uninterruptedly, the anterior emargination seen in the Hares being quite filled up with bone, while the posterior is also much less deep: the *ensemble* of these distinctions is, however, far better expressed by the pencil than by the pen, and the reader is accordingly referred to the accompanying figures of the skull of this animal, in different aspects of view.

What little is known of its essential anatomy is, as might be expected, identical, or nearly so, with that of typical *Lepus*. Mr. Pearson notices that "the mammæ are from six to ten; cæcum very large, apparently almost like a second stomach: womb double."

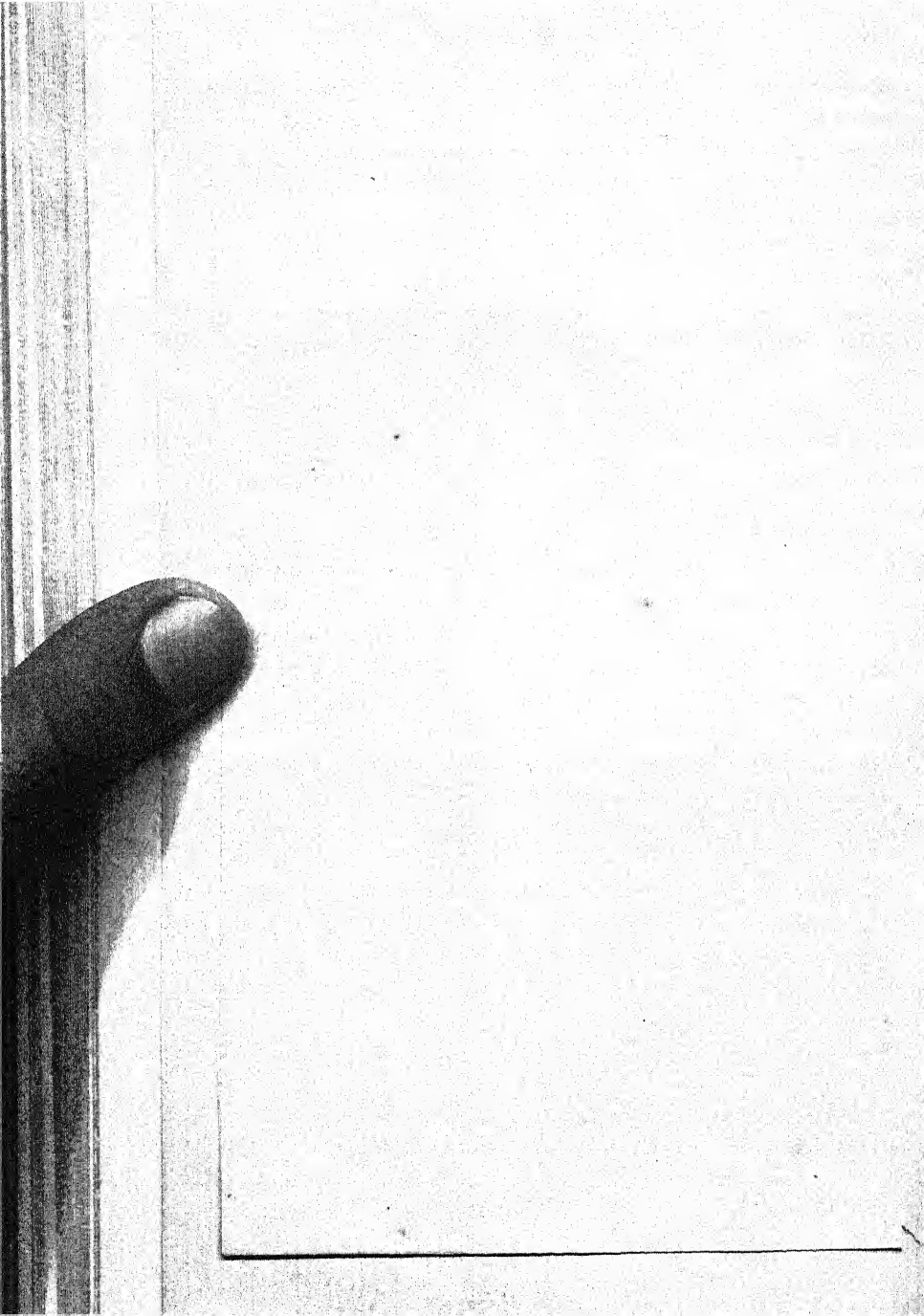
The length of the Society's specimen as mounted, and as represented in the annexed figure, is, in a straight line from nose to tail-tip, fifteen inches and a half; ears posteriorly two inches; tail with hair scarcely one and a half; tarsus to end of claws three and three-quarters; entire length of skull the same: fur of two kinds, that next the body short, delicately soft and downy, and of an ashy hue; the longer and outer fur harsh and *hispid*, and consisting partly of hairs annulated with black and yellowish-brown, and partly of longer black hairs, all the black having rather a bright gloss: lower parts paler or dingy whitish: toes somewhat yellowish-white: fur of the tail rufescent above and below, except near its base underneath, and not of the same harsh texture as the body fur.

Mr. Pearson, in his original description of this species, remarks as follows: "From the notes of Mr. C. D. Russell, who sent the stuffed



Caprolagus hispidus (PEARSON) BLYTH.

— Museum, Salt Lake City.



skin from which the description has been drawn up, I learn that the animal was killed on the right bank of the river Teestah, close under the saul forest, and about six miles north of Jelpee Goree. In this place they are said to be very scarce, not above four having been seen by Mr. Russell's party during ten days, though game of all other kinds was met with in great plenty; and the following year the same party killed only one. But towards the hills, as Mr. Russell was told by the natives of that part of the country, they may be met with in greater abundance. Of the habits of this animal little is known. Mr. Russell states, that 'its flesh is white, and eats very much the same as that of the Rabbit'; and from the circumstance of his never having succeeded in putting one up a second time, he is almost certain that it burrows. It is called by the natives of the country, where it was met with, by the same name that they give to the Hare."

Mr. R. W. G. Frith, upon examining the Society's specimen, believes it to be the same animal as has been very often described to him by sportsmen, who have on several occasions been shooting in the extensive sâl jungle in the district of Mymensing, called the Muddapore jungle, on the western or right bank of the Burrampooter river; but he never chanced to meet with it himself, though he long ago called my attention to the existence of such an animal in that part.

It is included in Messrs. McClelland and Horsfield's list of the Mammalia of Assam, *Proc. Zool. Soc.* 1839, p. 152, but with the statement that the ears are "very short, not projecting beyond the fur," which is either a mistake, or another species is alluded to; though I believe the former to be the truth: Mr. McClelland remarking, "I am indebted to Lieut. Vetch of Assam for the skin of this animal, but unfortunately the skull is wanting. According to Mr. Pearson, however, it is the same as the skull of the common Hare. It inhabits Assam, especially the northern parts of the valley along the Bootan Mountains." The differences of the skull from that of any *Lepus* have been already adverted to.

I propose that it should bear the generic name *Caprolagus*, and be accordingly styled *C. hispidus*, (Pearson,) nobis.

Report by Lieut. E. J. T. DALTON, Junior Assistant Commissioner of Assam, of his visit to the Hills in the neighbourhood of the Soobanshiri River. From the Political Secretariat of the Government of India. With a map.

Pathalipam Mouzah, *January 6th*, 1845.—Reached this yesterday evening from Luckimpore station, preparatory to setting out on a short excursion up the Soobanshiri as far as I can go in canoes, and thence to the nearest Meri villages by land. My object being to pay Tema Hazaree a friendly visit, and to ascertain if it be practicable to make a more extended tour through the country of the Hill Meris and Abors next cold season.

This day will be consumed in making the necessary arrangements—to-morrow I hope to start.

January 7th.—On the Soobanshiri. With quite a fleet of canoes, I started from the Pathalipam Ghaut at 11 A. M., and considering the difficulty of procuring boats and the number of people to be provided for, there was less trouble, confusion and delay than might have been anticipated.

Including my own boat there are eleven canoes, thirty-two boatmen, and with servants, Tecklas, Katokees and Meri Bhoteas, a guard of five sepoys; not less than seventy individuals, all packed as tight as herrings in a barrel. The canoes are moved by gold-washers who, from constant practice in their gold-washing expeditions, are masters of the art of managing boats in the difficult rapids of this river. Indeed I am told that no other men could venture to work up in canoes to Siploo Ghaut, whence we are to proceed by land. The canoes are very small, and, except a light mat over my boat, no choppers allowed.

Amongst these gold-washers are the Pawwas men, whose business it is to convey the Hill Meris and their families who annually visit the plains by this route from Siploo Ghaut to a Ghaut about six miles above Pathalipam. These men, six in number, being most expert of all, act as our steersmen.

They use paddles of "Hingoree," short and stiff in comparison with the long elastic "Bhola" paddles of the Suddiah and Debroo Thooms. They work the boat however exceedingly well; and no doubt in the pattern and material of their paddles, they have adopted what experience has taught them to be most serviceable for the rapids of this river. In the shallows I see they chiefly work with the luggee poles.

There is a rapid, but a slight one, immediately above Pathalipam ; and from this to the Hills the river is divided by wooded islands into numerous channels : two of these islands are partly occupied by Chuttiah Meris, and they are moreover a fruitful source of quarrelling among the gold-washers. On one of them, called "Indoor" Majali, they brought to our canoes, and commenced making preparations for halting there. I protested against this, as it was not 4 o'clock ; but they asserted very positively, that there was no ground on ahead fit for encamping on that we could possibly reach that night, and as I liked the appearance of the place, a fine shelving beach of sand and gravel, I gave my consent.

They waited till my cook had arranged his temporary kitchen and the dinner was in course of preparation, and then their object of halting on this island was made manifest. A number of gold-washers from the Bor Dolonee Mouzah, on the left bank of the river, were washing a little above the halting place. The Pathalipam gold-washers considered the ground theirs, and wished me to serve the intruders with a summary ejection. The left bank people as stoutly asserted that they were on their own ground, and it was by no means an easy dispute to decide. It depended on which of the channels is the main channel of the river, but the river takes to them all in turn about.

January 8th. Started after all had breakfasted at 8 A. M. The back ranges of the mountains are disappearing one after the other behind the upstart lower hills. The rapids numerous, but not difficult.

The Sonaris have boat songs, or professional melodies of their own : when wading and hauling the canoes up the rapids they sing a sort of "cheerly boys," the chorus of which is "Yoho Ram," and which heard above the roar of the waters has a good effect. In hollowing out these canoes the carpenters make in them holes of about an inch square to ascertain the thickness as they proceed. These holes are afterwards plugged. In my boat being driven in from above they protruded below, and two of them were at the same moment unshipped as we bumped on the stone of a rapid. The boat commenced rapidly filling, but we got her on shore and the baggage all removed, before any serious damage was done. I mention this as a warning to others. One minute's delay and the boat would have sunk ; we were fortunately near shore, had surmounted the rapid, and the crews of the other boats all at hand in a moment to assist.

Digression up the bed of a small stream called the Doolooni, to see the Raj Ghur. This Doolooni was one of the gold streams; but last year its bed of shingle was covered with fine sand which the gold-washers can make nothing of, and they have abandoned it. It forms also one of the passes by which the Turbotiah Meris descend, the Dirjoo flowing through Sugaldobey, which forms the other starting from near the same point in the hills. The Raj Ghur we found about a mile from its mouth. I have seen this Ghur at Goomeri, where it crosses the Booree river, and there it still bears the appearance of having been constructed as a rampart against the inroads of the hill people; but here it has more the appearance of an old road. It is however a stupendous work, and great is the pity that it is too far north of our population to be used as a line of communication. Previous to the Moran or Muttock wars, the villages of Luckimpore are said to have extended up to this Raj Ghur, and there is every appearance even now of such having been at some period the case. At the mouth of the Doolooni the Soobanshiri expands with a fine broad, deep and smooth basin, which it enters by three channels formed by two islands, where the stream again meets; above them it emerges from the hills, and here we halt for the night; our encamping ground is in the dry bed of the Bergoga.

January 9th. Our last night's bivouac was not a comfortable one. A stiff breeze blowing down the bed of the Bergoga, was met by another coming down the valley of the Soobanshiri, and they enjoyed themselves together at our expence, blowing the sand into the people's dinners, and the smoke into our eyes, and knocking the canoes against the stones. But we are now fairly amongst the hills, and truly the scenery is sublime. Beneath these hills, the great river winds in graceful serpentine. The basis forming the cliffs are rocky and precipitous to a considerable height, along which foliage of various hues and a most vernal and velvety appearance waves in the breeze. The stream is about 250 yards in breadth, but of a depth (sounded several places on returning and found between sixty and seventy feet in depth throughout this glen) unfathomable by any means we have at hand. There the rock of storms (the Botahkowa hill) stands boldly out from the mass on a bed of huge boulders screening the mouth of a deep, dark, narrow dell, the winding of which I explored for a little way—a way, where the sun's rays never penetrate; sometimes huge Bon-trees springing from the rocks above stretch their

sinewy limbs over the deep waters, which reflect them ; and the fibres that descend from them, finding no earth below in which to fix themselves, swing in the breeze.

As we advance the river becomes still narrower, but not less deep or smooth. Gockain Potana, a rock not less than 800 feet in height, rises perpendicularly from the stream. The face is almost smooth to the top which is clad with trees ; on the opposite side a similar cliff, but not so high : on the summit of the former a god killed a deer ; and, walking (clever fellow) down the face of the smooth rock with his quarry over the shoulder, he ascended with it the opposing cliff, *unde nomen*. From above, the rock called the Gockain Potana looks like a huge church-steeple rising from the stream. We stopped for sometime at a place called Pabo Ghaut to collect cane to be used in towing the canoes up the rapids on ahead. The Ghaut is so called from its having been some 50 years ago the watering place of a tribe of Meris called Pabon. One of the young men of this tribe stole from her village a young virgin of Tema's tribe, then under the management of his father Temees. For this offence the insulted Temeeans waged a war of extermination against the Pabo tribe. The villages of the latter were attacked by night when the inhabitants slept, and men, women and children were promiscuously slaughtered or carried away, and sold into hopeless captivity amongst the Abors. The tribe, consisting of two large villages, were utterly extinguished. Not far from this we halted for the night, on the right base of the river, at the mouth of a beautiful stream called the Gaien Panee, issuing from a dark glen and dashing down the rocks into the well-bound channel through which the Soobanshiri noiselessly flows. Notwithstanding the absence of large timber which appears to grow only near and on the summits of these precipitous hills, the verdure of this valley is very beautiful : the rocks themselves are frequently covered with moss and ferns of the brightest emerald green ; whilst springing from the soil above them bamboos of a peculiarly light and feathery appearance, the shafts not thicker than the most delicate trout rod, curve and waive in the slightest breeze. The pine-apple tree, the drooping leaves of which are found upwards of sixteen cubits in length ; the Toka palm, varieties of cane and the mountain plantain, are all characteristic of this scenery, and blend together in luxuriant mass.

10th. Early this morning we emerged from this great glen, and found the first of the great rapids at its mouth. The canoes were safely pulled up with the long cane ropes we had provided; above this rapid the stream widens, the valley expands, and more distant mountains appear in sight. Huge blocks of rock obstructing the river in its descent render the navigation more and more difficult. We were obliged to lighten our boats, and for some distance the baggage was all conveyed by land, whilst the canoes were dragged through fields of hissing foam, or over rocks nearly dry; after surmounting several such rapids we reached Siploo Mookh whence we are to proceed by land.

Luckimpore, February 11th, 1845.

February 21st.

MY DEAR MAJOR,—This being a holiday, I shall devote it to giving you some further account of my late excursion.

I wrote you a few lines from Siploo Mookh, detailing briefly my proceedings up to the date of my letter. On the 15th January all the headmen of Tema's tribe made their appearance, together with the ladies of Tema's family, who came expressly to welcome me—his two wives and daughter. I held an assembly, and particularly explained to the chiefs that if they had the smallest objection to my proceeding further I was ready to return; but they all assured me that such a proceeding would cause them great pain. They would be delighted to shew me all the lions of their country; but only begged, that as the small-pox was raging in the Pathalipam village, I would leave behind me all the Pathalipam men. This I readily consented to do, provided they procured me a sufficiency of Meri coolies. Affairs having been so far amicably arranged, a distribution of salt and rum concluded the conference; and the Gaums in high good humour disported themselves before me, shewing their agility in racing over the rocks, and their prowess in throwing stones across the river: mean time I gave the ladies who had come to greet me some gay colored cotton cloths; and here, alas, was cause for jealousy. The other Gaums would know why Tema's family alone should be thus favored; but I told them that when their wives and daughters came to greet me (as Tema's had done) and were neglected, they might take umbrage at my

partiality, but not now ; and with this they appeared satisfied. Late at night Tema and one of the Torbottiah Gaums again visited me. They said a sufficient number of coolies would by morning be collected, but they expected to be paid for the trip ; considering the friendly nature of my visit, and the honor thus done them, they (the Gaums) were ashamed to ask me to pay the people for conveying the baggage, but they had no power to give men without such payment being made ; and they therefore wished, if agreeable to me, to be allowed to *defray the cooly expenses between them*. Of course I declined this offer, though I was not a little pleased at its having been made, evincing as it did a genuine good feeling towards me. The rate was to be one seer of salt, or four annas, for the trip for each cooly, which the Gaums assured me was what they paid when, in bringing, as they yearly do, various commodities from the plains, they are necessitated to avail themselves of extra hands. Those who call themselves Gaums have no authority in their hills, but that of the rich over the poor. After the above noticed trait of liberality on Tema's part, and of the independence of the Hill Meris in general, I was not a little amused next morning when the Meri coolies, male and female, were receiving beforehand their seer of salt, to observe amongst the applicants for a load and a douceur, Tema's second wife and his eldest daughter, both fine young women ; but the latter much disfigured by small-pox. The loads were light, not more than twenty seers ; but boys and girls, men and women, were all paid the same rate. Considering all these arrangements had to be made, and that the greater part of the coolies had only arrived in the morning, I thought myself lucky by getting off by 10½ A. M. For the first two miles we proceeded along the left bank of the Siploo flowing from N. W., then turning north ascended a very steep hill ; sometimes almost creeping under jungle so dense, that nothing could be seen beyond what was a few yards to our right and left : the path was less difficult than I had been led to suppose it, but is sometimes zigzagged up or wound round precipices in an awkward manner for nervous people. Tema was my constant companion, always prepared to give me a friendly hand if necessary. He seemed at first to be under great anxiety on my account ; but finding me more active than he expected, he appeared more at ease.

Of the various timber trees and underwood, you know I am incapable of giving any account ; the most remarkable of the former were Seea trees, a

seed of which you returned me split open, the wood is hard, close-grained, and finely colored as the Nahore; the Assamese call it the Seea Nahore, and the fruit contains a poison with which the Meris kill fish. Great varieties of bamboos and cane. The Meris thatch their houses with the leaves of a species of the latter called Tor, the pine-apple tree, and the fern.

We passed several squirrel traps of an ingenious and simple construction. On an overhanging branch a seed (chesnut) of which the squirrels are fond is placed, and bound to the branch by a double band of cane; the squirrel cannot get at the seed without putting his head through a noose of the cane, and on his disengaging the bait the stone drops and tightens the noose round the squirrel's neck: they eat the flesh of this animal as a great delicacy. As we ascended this hill, the hill people frequently gave us lowlanders a warning to be careful not to loosen a stone from its bed. This was very necessary, people are apt to kick away stones on a hill that are easily dislodged; and had this been done on the present occasion, they must have fallen on or bounded near those coming up the winding path below us. Having descended a valley in which there was water, we commenced the ascent of another and loftier mountain called Teepooka. On this hill there are magnificent Nalok trees of enormous dimensions; descending again we came to a rocky stream called the Tiks, up the bed of which our path now lay, and this was to me the most difficult part of the road. The current was strong, and the rocks slippery as glass. It was difficult for me to maintain my footing, and as I proceeded along slowly and cautiously, the Meri girls with their loads came up and laughingly passed me, bounding with astonishing activity and sure-footedness from rock to rock. This stream takes its rise in the Moyur mountain, over which our path now lay; and learning that we should not see water again till evening I halted for stragglers, and when all had come up it was too late to think of attempting to proceed further. Crossing the stream accordingly, we formed our bivouac for the night. Tema endeavoured to persuade his people to assist in clearing a space for me, and to cut and bring wood and materials for a temporary hut; they treated his orders with the utmost contempt: upon my applying to them in a more persuasive strain, they bargained that I should shew them some fun with my guns, and in this way I got them to do all I wanted. We started next

morning at 8 A. M., and commenced a toilsome ascent of the Moyur mountain, the summit of which we did not reach till 11 o'clock; the ascent was very severe in many places, the natural ladders afforded by the roots of the trees alone rendered it practicable; near the summit it was less precipitous, and here were the timber trees and Seeas, wild mangoes, chesnuts and oaks, the seeds of all which I have sent you; but unfortunately the acorns were all dead. From the top of the Moyur no view was obtained; descending occasional openings gave us glimpses of new mountains, for we were now on the north side of the great range seen from Luckimpore, but no extended view; the path less difficult, but occasionally presenting but a mere ledge over a precipice, and dangerously slippery from decayed leaves. We descended about one-third of the distance we had ascended, and then crossed over several smaller hills, the northern outworks of the Moyur. In one place a large tree had fallen across a chasm deep and dark, and was used as a bridge. It was slippery as glass, and even the Meris passed over very slowly and cautiously; I did not like it much, but Tema gave me a hand, and I got safe across. We now came to hills that had been cleared for cultivation, and other symptoms of a near approach to human habitations; not that the road was better, it continued just as before, but here Myttons had been grazing, and they do not stray far from their villages. Several times we passed what appeared to be a well cleared path, but I was told that they led to where spring bows had been set to kill wild animals, and the clearance was made to warn human beings *not* to go that way. Depending much upon such stratagems for a supply of animal food, they have various ingenious methods of taking or killing wild beasts. A deer trap is constructed by running a light palisading between two precipices or other obstacles, in the centre of which the trap is placed. It appears to offer an exit to the unwary animal, whose course has been obstructed by the palisading, and through it he attempts to rush, when the top composed of logs of wood bound together drops on and crushes him. Bina Meris village was now before us, and drawn up on the side of the road a deputation of the Sonrok Meris (the Bor Dolonee Meris) awaited my approach. These Sonroks I had hitherto regarded as not near so well affected to us as the Temas and the Torbottiah tribes, and I had been informed by Tema that they were very irate with him for having encouraged this excursion of mine. I was by no means

anxious to meet them, and had not invited them to an interview : but here they were, and I could not decline it; so putting a bold face on the matter, I took a seat under a tree and gave them an audience. After having explained my object in visiting these hills, and thanked them for their civility in coming to meet me; very much to my surprise, instead of any objections being raised, they gave me a most cordial and pressing invitation to proceed to *their* villages too, saying as I had come as a friend to visit Tema, it was not fair that the honor should be conferred on him alone; they too were most anxious to entertain me, and would gladly provide every thing necessary. One of their villages, that in which the principal Gaum resides, was an easy march from where we stood. They did all they could to induce me to go, overruling all my objections as started. I had only supplies for three days,—they would provide every thing. At last I said it would be improper for me to go to their village without bringing with me some presents to bestow on their wives and daughters to cause them to remember my visit. That of the few things I had brought of this description, had been disposed of, or were bespoke, and were I now to go empty-handed to visit them, they would all say that I had bestowed many marks of favor on Tema's people and to them had given nothing. I therefore could not now go; but if all turned out well, and they behaved themselves properly on their next visit to the plains, they should receive a visit from me at another season intended for them, as my present visit was for Tema. With this they appeared satisfied, and only further begged that I would excuse the old Gaum coming to meet me in another Gaum's village, which would be derogatory to his dignity, and allow him instead to pay his respects at Siploo Mookh, or on the road down. This was so ruled, and thus quietly ended the conference with the ferocious Sonroks. Bini Gaum's village which we now entered, is situated on one of the low hills under the Moyur mountain; the houses are long, and raised considerably on posts of cleft timber, indiscriminately constructed on the top or side of the hill, but the level of the flooring is tolerably well preserved by varying the height of the supporting posts. It contains only ten dwelling houses; but as each house holds an entire family, including brothers and their wives, and married sons and their children, each may on an average contain about twenty individuals. The situation of the village is very beautiful. The

low hills around,—some partly cleared for the purposes of cultivation, some entirely so, and now covered with the straw of the crop last reaped,—appear in fine contrast with the dark tints of the lofty mountains of Moyur and Yaloo, and others more distant that surround it. The inhabitants, men, women and children, far from evincing any signs of fear, crowded about me as I passed through the village. The road from this to Tema's village, which is about two miles distant and north-west of this village, continues over low hills, many of which have been cleared and are now fallow, and after a time will be again taken up. Between the villages barricades are constructed in different places to keep the Myttons from the cultivation when necessary. We followed the windings of a stream called the Kutoo, and were led by it into a pretty little valley comprising a level space of cleared ground of some extent, watered by the Versing river which winds round the hill on which Tema's village is built, and here we encamped; Tema's village within hail above us to the S. E., the river flowing from the N. W. Here were assembled to meet me, besides the notables of the three villages of Tema's, or the Pambottiah tribe, all the headmen of the *Torbottiah dewar*. They* seemed to wonder much at my visit. What could it portend? and to be in some alarm; but this soon wore off. They describe their country as much better worth seeing than this. The villages are larger, more numerous, and nearer to each other than those of this dewar; the nearest a day's march from this, about twelve miles in a direction north by west. The villages are six in number, and within hail of each other, on hills as Tema's and Bina's, and the houses similarly fashioned; their cultivation is more extensive, the crops fewer, and more varied. They have asso, dhan, and hali; but the latter is not planted out. They sow the seed as we sow peas. They kept me talking till dinner time, and then all retired with Tema, who had a grand feast, not less than eighty individuals were entertained by him; all that came to see me were invited, and I am told his house was crammed: nor were we neglected, a fine fat kid and fowls and eggs, yams and sweet potatoes and Indian corn were supplied. Tema asked me if I would drink *mhud*, the spirit they distil; but this I declined, or doubtless a large supply would have been sent.

* The Torbottiahs.

Next morning I proceeded to the village, and found them all busily engaged in divination as to whether my visit was to bring them good or evil. I was told that the auspices were favorable. A man sat apart from the rest holding in both hands a puny chicken, and invoking all the spirits of the woods by name. Those deities who delighted in the blood of Myttons, and those who rejoiced in the slaughter of pigs; those who were propitiated by the sacrifice of fowls, or those who were content with a vegetable offering, all are on such occasions invoked; and after the *Chout* is terminated, the chicken is cut open and the entrails examined, from which they augur good or evil. Often as this "auspiciu" to my knowledge has failed them, they most pertinaciously adhere to the practice; and undertake no expedition, journey or work, without consulting it. I was sketching, and when the "auspiciu" were being taken, and when the ceremony was concluded, they sent to me to beg of me to return to my hut to give audience. I desired for peace' sake to give it where I sat; but the Torbottiahs who wished to pay their respects in regular form, could not, they said, with propriety do so in Tema's village. However, previous to descending I paid Tema's house a visit, to which he made no objections. The house is seventy feet long, raised on timbers, some perpendicularly and some diagonally placed, in which is laid a platform of bamboos for a flooring. The roof has gable-ends, and is pitched very high; the thatch being composed of the leaves of a species of cane as before mentioned. Under the gables a cross chopper covers in an open balcony, one at each end. The interior consists of one long apartment sixty feet by sixteen, from which a passage extending the entire length is partitioned off. In the large apartment down the centre no less than four fires were burning on hearths of earth. On one side were ranged, with some appearance of order, their arms, pouches, travelling apparatus, &c.; another portion of the apartment was decorated with trophies of the chase. In the centre between the fires frames of bamboos suspended from the roof served as tables, on which various domestic utensils were deposited. I had hoped that the passage which was partitioned off from this apartment contained the dormitories of the family, but on examination it was found to be the *mhud* cellar. In it were ranged conical baskets lined with plantain leaves, in which the *mhud* is fermented, and received in vessels placed underneath: in the large apartment the whole family eat, drink and sleep.

Tema and his wives in the upper end or first fire, his sons and daughters round the next, other members of the family round the third, and slaves and dependents round the fourth. Fearful of being pillaged by the Abors, they do not venture to display much property in their houses. The greater portion of it lies buried in some remote spot known only to the heads of the family. Besides cattle, ornaments, arms and wearing apparel, it consists of large dishes and cooking vessels of metal, and what are called *Dao Guat*, such as little bells with various devices and inscriptions, in what I fancy must be the Thibetan character; but I know it not. The Meris do not know where they come from; a few are occasionally obtained in barter with the Abors, but the most of them have been handed down as heir-looms in the family, and they are regarded as the most valuable portion of their property. They are occasionally used as money, and valued at from four annas to twelve rupees each, according to shape, size and ornament. Those with inscriptions inside and out are most highly prized. Those without inscriptions are little valued. These bells are common amongst the Dufflas, who can give no better account as to how they became possessed of them. I am told the Butias sell them, and if so you can perhaps tell me something of their origin. The Meris tell the same story if asked where they get their fine blue beads, *i. e.* that they are heir-looms; very seldom, they say, are they now procurable in barter or exchange, though some few are occasionally procured from the Abors.

It is not impossible that numbers of these bells and beads thus handed down as heir-looms may have been brought with them from the country from which they originally emigrated. Regarding their migrations they have no traditions. They believe, and they are not singular in the belief, that many orders and races of men were created, whom the Creator allotted to dwell where soil and situation were best adapted to the constitution and habits he had given to each; and thus that the Meris were created for, and have ever dwelt in these hills. Their religious ideas are very vague. They believe in a future state, and have an indefinite idea of a spirit who presides in the regions of departed souls, as is shewn in their mode of disposing of their dead. The body is interred fully clothed and equipped with arms, travelling pouch and cap, in a deep grave, and surrounded by strong timbers to prevent the earth from pressing on it. Nor do they omit to supply

the departed for his long journey with food, cooking utensils, and ornaments of value, so that he may make a respectable appearance in the other world. They attach great importance to their dead being thus disposed of and buried near the graves of their ancestors. If a man of any influence dies in the plains his body is immediately conveyed to the hills to be so interred, should the disease of which he died not be deemed contagious.

Marriage, although its violation is considered the direst of offences, is with them a mere matter of barter or exchange. Young ladies are in the first instance valued according to the wealth and respectability of their parents. The price is such that few suitors are able to make it up for several years after preliminaries have been arranged, and they pay it accordingly by instalments. It consists, if the damsel be of high family, of two or three Myttons, twenty or thirty pigs, fowls, mhud, and sometimes clothes. When the parents are content, or the stipulated amount has been paid, they invite the suitor with his family and friends to come for his bride, and he is entertained that day by the father of the lady. On his return with his wife all the friends and relations accompany him, and the bridegroom or his parents now in their turn have to feast them and his own friends into the bargain for several successive days. There is no further ceremony. The parties are now considered man and wife; and woe be to him that seduces from her lord the wife so wedded. The adulterer is seized and securely bound, detained under most rigorous treatment for a day or two. If he be powerful his friends come to his assistance, and make offers for his ransom, which must be considerable to be accepted; but the chances are, he is left to his fate, and if such be the case he is put to death. The woman who has committed the *faux pas* is less severely dealt with. A little wholesome chastisement, and she is again admitted into the family circle. It must not be omitted that when a marriage is concluded, the bridegroom expects to get fair value with his bride for his pigs, &c. that he has expended on her. If personally, or in default of an adequate *trousseau* she be found wanting in this respect, there is a dinner, an assemblage of the mutual friends, and the parents of the bride are made to disgorge should it be so determined; or should they refuse, their daughter is treated as a slave, and not as a member of the family: notwithstanding this, a widow cannot leave her husband's family and heirs to contract a fresh

marriage unless she can find the means of defraying all that was originally paid for her ; if she can do this and furnish a feast on the occasion, there seems no objection to her making a second alliance. The costume of the women is peculiar : a short petticoat extending from the loins to the knees is secured to a broad belt of leather which is ornamented with brass bosses, besides this they wear round their middles an infinite number of rings made of filaments of bamboo embroidered with the fibres of another plant. A band of similar material, from which a bit of cloth is suspended in front, is bound tightly round the breast under the arms. This is their travelling and working dress ; but at other times they wrap themselves in a large cloth doubled, brought over the shoulders, and pinned in front like a shawl. They wear round their necks an enormous quantity of beads, mostly of blue, like turquoise, but also of agate, cornelians and onyx, and glass beads of all colors. They have bracelets of silver or copper, and anklets of finely plaited cane or bamboo. Their hair is adjusted with neatness, parted in the centre and hanging down their backs in two carefully plaited tails. In their ears they wear most fantastic ornaments of silver, which it would be difficult to describe ; a simple spiral screw of this metal winding snakelike round the extended lobe of the ear is not uncommon amongst unmarried girls ; but the ear ornaments of the matrons are much more complex. They generally have very sweet countenances, though few could be called handsome. The almond-shaped eye is common, but not universal ; mouths generally well formed ; and teeth, notwithstanding the free use of tobacco, very fine and white ; their complexion what the natives of India would call fair, but they have rosy cheeks and ruddy lips, which is a decided improvement on the Assamese complexion ; they are very stoutly built, generally short of stature, but to this there are remarkable exceptions. The men have fine muscular figures ; many of them tall and with good features, but the countenances of some are repulsive. The variety of feature denotes an admixture of races, and no doubt many of them have Assamese blood in their veins, but usually there is the high cheek-bone and almond-shaped eye, lips rather thin, and face devoid of hair except a few over each extremity of the mouth forming an apology for a moustache. They gather the hair to the front, where it protrudes out from the forehead in a large knob secured by a bodkin ;

round the head a band of small brass or copper knobs linked together as tightly bound. In their ears they as well as the women wear a variety of ornaments, but of a distinct kind. The lobe is distended so as to hold a knob an inch in diameter. It is gradually enlarged by the insertion of a roll of the leaf of the pine-apple tree. The chiefs wear ornaments of silver, shaped like a wine-glass or egg cup; young men do not venture to attach so heavy a weight to the slight ligament, and insert a hollow plug of silver instead. The males also wear a profusion of the blue beads before mentioned, and others, all very large. Their costume is simple enough—a band round their hips composed of rings of bamboos, the same as worn by the women but not so numerous; an apron attached thereto before and behind, and a cloth wrapped round their body and pinned so as to resemble a shirt without sleeves; a cap of cane or bamboo work with turned-up peak, which however is worn behind, and over their shoulders as a cloak, which also serves as a pouch or knapsack, they throw a covering made of the black hairy fibres of a plant, which at a little distance resembles a bear-skin. Their costume is not complete without placing on their heads and over their caps a piece cut out of tiger or leopard-skin, the tail of which hanging down their backs has a droll appearance! They are all very filthy in their persons, many of them appear never to have had their faces washed since their birth. As this was not their cultivating season, and the crops had been reaped, it was chiefly from information that I could note any thing on the subject. Each village has a certain extent of ground, comprising hills, sides of hills and valleys, which they have been in the habit of cultivating from time immemorial; but not more than a fifth of this ground is under cultivation each season. They cultivate each patch two successive years, and then suffer it to be fallow for four or five, taking up again the ground that has been longest fallow in lieu. They have a superstition, which deters them from breaking up fresh grounds so long as their “Gra” (fallow) is sufficient—a dread of offending the spirits of the woods and forest by unnecessarily cutting down the trees. In Tema’s village the chief crops are “Bobesa” or bobsa dhan, the grain of which is large, pear-shaped; and goom dhan, or maize. Many of the villages have aoosa and hali, resembling that which is grown by the Assamese; but the cultivated

tracts appertaining to this village get too little sun for those crops. The bobsa and goom dhan are sown in the same ground and at the same time, and round the squares which contain these crops they plant yams and other edible roots ; they have not got the potato, but it would most likely grow well and be serviceable to them ; they sow red pepper, which succeeds admirably. Tobacco is generally grown in patches near the houses. The labour of cultivation and all labour falls chiefly on the women. They have few of them other implements than their *daws*, which are used to clear, cut and dig with. The men consider it sufficient to occupy themselves in hunting and attending to their various snares and spring bows for wild animals, and when the season arrives for the trade, in collecting manjeet, which is performed by both sexes.

The manjeet grows in steep declivities, interlaced and entangled with other shrubs, so that it is not easy speedily to collect a quantity, at least all that I found of it was little ; the leaf of the genuine kind is small, narrow and pointed, and slightly suffused with a tinge of the colouring matter. There is a bastard kind also found in great quantities, the leaves of which are very much larger and the plant altogether coarser in appearance ; it is called the female manjeet by the Meris, and though similar in growth with the other, its flexible shoots contain scarcely any colouring matter. Nevertheless, it is sometimes brought down mixed with the finer. The Meris assured me that this fraud was not theirs, but was practised upon them by the Abors. I recommended them for their own sake to bring down none but the best, and they promised that none other should leave their country. They collect and tie it up in bundles when fresh and flexible, then lay it on frames or hang it up to the eaves of their houses to dry ; when it becomes rather brittle, it is fit for exportation. The Mytton is the only species of horned cattle possessed by the Meris. It is rather a clumsy looking animal in make ; but a group of Myttons grazing on the steep rocky declivities they seem to love, would be a noble study for Landseer ; some are milk-white, some nearly black, some black and white, and some red and white. To the Meris they are only useful as food. On festive occasions one is killed, and I should think the beef must be excellent ; they feed most delicately on young leaves, and keep in excellent condition. The

cows would, I have no doubt, give a large supply of milk; but the Meris have not yet found this out. I asked them to procure some for me, but received the usual answer, "Meris don't know how, not our custom." The females appear tame, and submit to be tethered; the bulls rove their own masters, but do not wander far from the tethered females, so are in a measure tethered too; just now they all roam where they please, but when the crops are on the ground a mountain or so is fenced round by strong timbers from tree to tree, and into this enclosure they are driven, and remain till the harvest is stored. They have pigs and poultry in plenty, and a few goats. I suppose there are no people on the face of the earth, more utterly ignorant of every thing connected with the arts than are the Hill Meris. With the sole exception of the bands and other articles of bamboo cane and fibres above-mentioned, which the women are everlastingly making, every thing they use is imported; were their communications directly with the plains, and indirectly by means of the intervening tribes, with the civilized countries on the other side of the great range cut off, the use of metal and of women's clothes would be lost to them. The Abors can forge themselves daws, but the Meris know not the art. The most distant tribes manufacture coarse cotton cloths; but though the Meris are in constant communication with them, as well as with us, they have not the remotest idea of weaving. They cannot journey two or three days from their village, without having to cross a considerable river. If it be not fordable, a rough raft of Kakoo bamboos is hastily constructed for the occasion; but though constantly requiring them, and annually using them, they have never yet attempted to construct a canoe: this is the more strange, as the Abors of the Dabong push a considerable trade in canoes cut in the rough. I suppose that until the Meris discovered the fertile plains of Assam, which they were first led to visit by having killed birds in whose bellies they found rice, and discovered by proceeding in the direction of their flight, they were mere savage hunters; the skins of beasts their only clothing, and the flesh their chief, if not only food.

Could they be stimulated to a more industrious course of life, they might considerably improve their commercial relations with us. The great rivers that enter their country abound in gold grains; the process

of washing is simple, and the Meris have had for two centuries constant opportunity of watching it in all its phases.

The last process of separating the gold from the remainder of the sand or scoria, they might leave to the Assamese gold-washers; but the rough washing with the *doorunnee* and bottle gourd might be performed by them, and a considerable quantity of gold introduced. The *doorunnee*, or tray, is very simple and easily made, and the gourds are obtained from the Meris by the gold-washers. This would be a most lucrative trade for them. By a little attention to the manjeet also, which they are too lazy to give, its growth might I think be improved and its collections facilitated, simply by the removal of other plants that choke it. I have not much more to say; but I may send you another chapter* if you are not tired of me and the Meris. But this letter has grown to such a length, I fear you will be inclined to throw it into the fire without reading it.

I have no doubt that there are sundry errors in this account; but I cannot stop to correct them, for I feel sure if I were to read over what I have written I should hesitate about sending it. I had not intended sending you the journal up the river, it was copied to send home with sketches; but as you seem interested in the scenery of the Soobanshiri, I have ventured to add it.

Yours very sincerely,

(Signed) E. T. DALTON.

(True Copy,)

(Signed) F. JENKINS,

Agent to the Governor General.

(True Copies,)

J. CURRIE,

Secretary to the Govt. of India.

* Trade with us and with Abors; position of villages; rough estimate of population; Abors, Accas, not yet touched on. All these however might be included in a public letter applying for leave to make a more extended excursion next year.

Notes, principally Geological, on the South Mahratta country—Falls of Gokauk—Classification of Rocks. By CAPT. NEWBOLD, F.R.S. &c. Assistant Commissioner Kurnool.

The reader has already been introduced into the South Mahratta country at its eastern angle near the confluence of the Kistnah and the Gutpurba.* We will now proceed westerly across it, following the right bank of the Gutpurba to the Falls of Gokauk on the Eastern slope of the Western Ghauts, leaving the Kolapore territory to the right.

I crossed the Kistnah about two and a half miles below the *Sungum*, or confluence, and passed up the opposite bank towards the tongue of land formed by the junction of the rivers. The apex consists of silt, sand and clay, in regular layers, rising, as they recede, to the height of about sixteen feet above the surface of the water.

A section of these layers was afforded in the sides of a deep cleft running down to the Gutpurba. They present a striking illustration of the formation of fissures in sedimentary rocks, simply by the mass contracting in consolidation, unaided by subterranean movement or displacement, which we are compelled to call in to our assistance in explaining the great faults and displacements, attended with scorings of the faces of the fissures, and the polishings termed "slickensides," so common in the coal measures, and other old sedimentary rocks of Europe. Earthquakes, another cause of fissures, are unknown here.

The fissures in these layers of silt and clay are usually vertical, and widest in the more consolidated layers; their course is often zig-zag, like that of the celebrated gap in the sandstone rocks of Gundicotta through which flows the Pennaur; or, like the fissures in the *Regur* deposit: during the hot months they frequently intersect each other.

Horizontal seams, independent of the parallel laminæ of deposition, have been formed, partially filled with a titaniferous iron sand, which owes its arrangement, and segregation in distinct layers partly to its greater relative specific gravity, and partly to the motion of the water.

The truth of this is easily illustrated by the simple experiment of mixing intimately some common quartzose sand with a portion of the

* See Journal, Vol. XIII. p. 1004.

iron sand, and throwing them into a tumbler a quarter full of water.

If the tumbler then be inclined to one side, and gently moved so as to cause the water to move backwards and forwards over the surface of the sand, the particles of quartz and iron gradually separate and become arranged in distinct layers.

The upper beds of the section are of loose silt and sand, the lower layers are more consolidated, and towards the base of the cliff thin layers of an indurated liver-brown marl alternate; both the silt and marl effervesce slightly with acids. At the bottom of the fissure runs a rain channel, which has washed the sides into salient and re-entering angles. In some places they have been excavated and undermined by it, and portions of the superincumbent layers have fallen in. In short, we see on this diminutive, yet true scale, all the striking features of precipice, ravine, pinnacle, and castellated form so remarkable in the sandstone and limestone formations.

Tabular cavities appear in many portions of the cliff which have neither been caused by snails, nor other boring conchifers. They have originated from the stems of long grasses, around which layer after layer of silt, &c. had been deposited until the stem decayed away, leaving an empty cavity modified by the action of the rain trickling down it into the substance of the rock. In many of these cavities the grasses are still seen. The iron sand is slightly magnetic, infusible per se before the blow-pipe; and forming with difficulty a blackish slag; it tinges borax of a brownish green. It has probably been derived from the neighbouring trap formation.

The Rivers Kistnah and Gutpurba. The Kistnah near the confluence is apparently about 500 yards broad, and the Gutpurba about 100. The current of the former had a velocity of about two and a half feet per second, and the latter about two and three-quarter feet.

The temperature of both rivers, one foot below the surface, was exactly the same, viz. $76^{\circ} 5'$. Temperature of air in shade 76° ; in sun 84° : month July, river swollen by the monsoon freshes. Mean temperature of the South Mahratta country at Darwar, according to Christie, is about 75° . As both rivers were nearly full, there was no opportunity of examining the size and nature of the pebbles in the bed. On the banks are scattered water-worn fragments of chert, quartz, granite, trap,

felspar rock, hornblende schist, jasper, lateritic conglomerate, kunker, ferruginous clay, greyish blue and sand-coloured limestone, sandstone, and calcedony. None of the fragments that had been transported by the current were more than three or four inches in diameter.

A tumbler-full of the turbid water deposited about 1-20th of its bulk of a fine sandy brown sediment, which effervesced with acids; very different, like those of the Bhima, Godavery, Tumbuddra and Cauvery, from the *regur*, which, as before mentioned, is supposed by some geologists to be a deposit of these rivers. The freshes of the Kistnah do not, according to the testimony of the oldest boatmen, ever overflow the banks more than half a mile; and its inundations at Danoor, and other places where I have crossed it, rarely spread to a greater extent. These facts argue strongly against the theory of the fluvial origin of the *regur* which is seen covering vast flat plains like seas, which extend, I may say, hundreds of miles from the banks of these great rivers. With regard to Christie's theory of its being the detritus of trap rocks, I have before observed that the iron contained in them oxidizes, becomes ultimately reddish or coffee-coloured in weathering, and imparts its colour to the detritus; and that the alluvium we now see brought down by the Kistnah, Bhima, and Godavery, which rise in and flow over the great trap formation, is of a brown colour, very different from the bluish black of the purest *regur*. One of the richest and most extensive sheets of *regur* in Southern India, is that of the Ceded Districts, which is watered by the Tumbuddra, Pennaur, and Hogri rivers, the courses of which on no point touch the trap formation, passing over plutonic and hypogene rocks, sandstone and limestone. If the rich sheets of *regur* which cover the plains of Trichinopoly, Artoni, and Cuddapah had been derived from the great trap formation, one would naturally expect to find in it, or associated with it, grains or fragments of calcedony, agate, jasper, heliotrope, and other hard minerals so abundant in the overlying trap: but there is no instance on record of such fragments having been found in these *regurs*.

The *regur* is seen too, far above the present drainage levels of the country. At Beder, as already observed, both Voysey and myself found it on cliffs nearly 200 feet above the general level of the surrounding country.

The boiling point of water at the Sungum was 200.3. Temperature of air at the time of observation 80°.

On the S. bank of the Gutpurba are some low hills running E. S. E. The only one which was examined proved to be a breccia, overlying the light blue and buff limestone, composed of a dark red or liver brown clay, highly indurated, and passing into jasper imbedding angular fragments of the siliceous portions of the subjacent limestone, chert, quartz, &c. The angular fragments of chert are often so small as to give this breccia the appearance of a porphyry, for which some portions of the rock might at first sight be mistaken, and a bed of really aqueous origin confounded with a plutonic rock—an error which has happened.

Proceeding westerly from the limits of the hypogene schists, the imbedded fragments in this breccia become larger, and the conglomerate character cannot be mistaken. It is evident, from the gradually increasing size of the pebbles, that the rock whence they were derived is neared as we advance west, and that the current which deposited these beds of sand and pebbles must have had an easterly direction.

This inference proved correct; and the limestone was found *in situ* at a short distance west from the hills, on the S. bank of the Gutpurba, in broken-up and dislocated strata; some of the limestone slabs had been furrowed as if by the action of pebbles passing along them in an east and west direction. Dark veins of chert projected every where from the water-worn blocks and slabs of this limestone, many of which are thickly encrusted with depositions of a ferruginous kunker which abounds. The limestone often abounds so much in silex, and is so indurated as to give fire with steel, and hardly effervesces with acids, save in a pulverized state. Marks of aqueous abrasion and plutonic disturbance which preceded the formation of the breccia are very apparent in this locality.

Sitadonga hills. A plain almost covered with *regur* extends from these low hills of breccia to the Sitadonga range, which abutting on and confining the Gutpurba on the north, run down to Badami and Gujunderghur on the south. The hills at this point consist of sandstone and conglomerates, the latter usually the lowest in position, both partially capped by a lateritic conglomerate which, in many places, has evidently been stripped off by denudation. The conglomerates are

often of a highly ferruginous and jaspideous character, and imbedding fragments of chert, quartz, and shales from the limestone.

As these hills are ascended, the sandstone gradually loses its conglomerate character, passing into almost all the varieties it is susceptible of, from yellow and reddish rock containing much argillaceous matter, to a loose gritty sandstone with red and yellow bands, which passes into a compact white sandstone, approaching quartz rock, containing specks of oxide of iron, or decayed felspar, in minute cavities.

On the summit of the Pass was a fine whitish sandstone with reddish streaks, composed of grains of quartz held together by whitish decomposed felspar.

On many of the slabs the ripple mark is distinct, running nearly N. and S., which shows that the current must have had an easterly or westerly course in this locality. At the western base of the Pass the coloured argillaceous shales, into which the limestone usually passes near the line of junction with the superimposed limestone, have been invaded and cut by a dyke of basaltic greenstone, and converted into reddish, greenish, and brown coloured jasper and bluish white chert in alternating layers; each line of which presents the original lines of deposition. Two other dykes, or ramifications, are crossed in the plain or valley extending from the base of the first Pass to another range probably a spur or outlier of the ridge just crossed, and though curvilinear, having a general direction nearly parallel with it. Green argillaceous schists, altered by the basaltic dykes, and in almost vertical laminæ, occupy the bottom of the intervening valley. The spur or outlying range is of a compact sandstone capping the schists and dipping at an angle of about 28° towards the S. W. Near the summit of the range it contains a bed of very fine white and red clay which is extensively excavated by the natives, who use the former as a whitewash and to paint the mark of caste on their foreheads.

The Gutpurba finds its way easterly through a break just below this rock, and rushes through the ridge just passed, by a still narrower and more rugged gorge.

Leaving the excavations, the traveller descends the sandstone spur into the extensive and fertile plain of Bagulcotta, based on limestone and its associated coloured shales and schists; bounded on the east by the Sitadonga or Gujunderghur range; and, as far as the eye can

reach, on the west by the ranges west of Kulladghur, and those of Gokauk on the flank of the Western Ghauts.

Plain of Bagulcotta. This plain continues westerly to within a few miles from Kulladghi, watered by the Gutpurba on the north, and bounded by a long, low, flat-topped range, evidently of sandstone; to the S. the limestone, which bases it, has a general dip of about 25° towards the E. N. E. at Bagulcotta, and a direction nearly parallel to that of the sandstone ranges, viz. N. N. W.; both dip and direction, however, vary occasionally, probably from flexures and disturbance by plutonic intrusion. The limestone in the vicinity of Bagulcotta and Kulladghi is of various shades and textures; sometimes as white and crystalline as marble, and composed almost entirely of carbonate of lime; at others siliceous or magnesian, or passing into whitish, green, blue, red and chocolate-coloured argillaceous shales. At Bagulcotta a pale buff coloured limestone occurs, portions of which might be applied to lithographic purposes; specimens of it I believe have been sent to Bombay for trial, but in consequence, probably, of not being selected properly, have been rejected as too hard, or for being veined.

The site I hardly conceive has had a fair trial; by the sending down a person *practically* qualified to select specimens, and by the quarrying a little deeper than has hitherto been done, I have little doubt that better samples of the stone might be got. Talicotta however, as mentioned in a previous paper, is the most promising locality for lithographic limestone.

The purer white crystalline variety is broken up into small fragments, and burnt into lime. I observed in it the same green chloritic flakes which I afterwards found veining the marble in the quarries of Mount Pentelicus near Athens, and in the Cipolin Marbles. A pale salmon, or flesh-coloured subcrystalline variety, resembling Tiree marble, occurs both near Bagulcotta and at Sullakairy, a village about three miles S. from Kulladghi.

About three miles to the E. of Kulladghi a few low hills of a lateritic conglomerate rest on the limestone and associated shales, running parallel with the sandstone ranges. The cementing substance is partly a calcareous, and partly a clayey paste of a yellowish or reddish colour, imbedding nodules of laterite. The lower portions of this rock are more compact than the upper, and exhibit distinct lines of

stratification. The range on the left, or south, of the road from Bagulcotta to Kulladghi, consists of sandstone and conglomerate. The latter imbeds pebbles both rounded and angular from the harder and more siliceous portions of the subjacent shales and limestone, and also pebbles of an older sandstone, which I did not discover in *situ*; these beds are not inclined so much as the limestones and shales on which they rest, but dip to the same point of the horizon.

Kulladghi. The nullahs in the vicinity of Kulladghi afford good sections of the limestone and its associated shales which, from their highly inclined and bent strata, have evidently suffered much disturbance from plutonic forces. The frequent alternations we see of those rocks, in a very confined area, induces the supposition of the beds having been folded back upon themselves, and thus produced the appearance of a double and reversed alternation, the upper parts of the folded strata having been carried away by denudation, as is seen to be the case on the face of some of the magnificent precipices of the Alps.

The shales are beautifully marked by white, blue, green, yellow, and red coloured bands; and seamed with arenaceous layers. The open seams of the rock are often encrusted with kunkerous infiltrations.

Slate quarries of Katurki. On the Maningpur road near the village of Katurki, about one-half koss from Kulladghi, these slates split into rhomboidal forms by joints, and yield good hones; at Sullakairy tolerable roofing slates, slates and slate pencils are quarried. Sullakairy, as before stated, is about three miles from Kulladghi, on the Gujunderghur road.

The lower beds of the quarried rock at Sullakairy are of a massive blue slate interstratified with a softer lamellar variety, easily fissile, and divisible into leaves which are often not more than a line thick; dendritic markings are frequently seen on the surfaces of the laminæ.

From the more massive beds are hewn large blocks for pillars of pagodas, Hindu idols, &c. Roofing slates are not much patronized by natives, who prefer tiles, thatch or mud, but considerable quantities have been here quarried and sent to the British cantonment of Belgaum and the Portuguese Indian metropolis, Goa. The prices at the quarries, I was informed on the spot, for slates of a foot square and quarter or half an inch thick, are five rupees per hundred slates; they

may be procured however of much larger dimensions, and of any degree of thinness. A capital writing slate and pencil were cut for me out of the quarries, shaped and polished all in a couple of hours.

A loose, friable, dark blue slate in the bed of the nullah near the quarries is sometimes pulverized and ground up with water and used as a blue wash for houses, &c.

Iron Mines of Hirasillaky. Iron ore is procured, according to native information, near the village of Hirasillaky, about two and a half koss from Kulladghi. The metal sells at from two to two and a half rupees the pukka maund of forty-eight seers. Land carriage by bandies or bullocks, and abundance of cheap fuel for smelting are readily procurable.

From want of time and opportunity, my visit to the hone quarries of Katurki was by torch-light, when little was to be made out regarding the thickness or nature of the beds furnishing the Novaculites.

From Kulladghi to the Falls of Gokauk. Proceeding in a W. by N. direction near the right bank of the Gutpurba, towards the falls of Gokauk, over extensive plains of *regur* with patches here and there rendered sterile by saline infiltration (the muriate and carbonate of soda,) the limestone and its associated shales are occasionally seen basing the plains intersected by dykes of basaltic greenstone, of which four were counted between Lokapoor and Hulkoond, about twenty-three miles distant from Kulladghi; to the intrusion of these dykes much of the alteration seen in the limestone is attributable.

A little to the west of Hulkoond the great overlying trap of the Deccan is seen to extend over the surface of the schists, and may be traced nearly to the base of the sandstone cliffs to the south and west, covered by sandstone debris; a few scattered sandstone outliers occur between Hulkoond and Kulladghi.

At Munnikerry, about twenty-six miles from Kulladghi, is a ridge of sandstone, approaching a quartz rock in compactness, intersected by a net work of brown, ferruginous veins. The sandstone is, in some situations, covered with a breccia composed principally of sandstone and quartz in angular fragments cemented by a ferruginous clay.

Close to a small pagoda, the sandstone at the S. W. flank of the ridge near the edge of the overlying trap is penetrated with a vein of black manganese, associated with iron, about three inches broad.

At Bugganala, about two and a half miles westerly from this sandstone ridge, the limestone and shales are again seen dipping N. 20° E. direction of strata E. 20° S., layers and veins of a reddish jasper and chert intersect the limestone, a phenomenon that is usually seen where the limestone comes in contact with plutonic or hypogene rocks.

Farther west, between Bettighirry and Ooperhutty, a bed of quartzzy talcose schist, approaching protogine, is crossed with layers of lithomarge.

Nearer Ooperhutty, the overlying trap is again seen in low cliffs on the banks of a nullah, resting on a red amygdaloid, which contains layers of a fine red bole with a shining streak, and conchoidal fracture. It does not adhere to the tongue; falls to pieces in water; does not form a plastic clay.

The trap is associated with wacke, with green earth in nests, and a chocolate amygdaloid reticulated with strings of calc spar, and imbedding calcedony and zeolites.

A loose sandstone, associated probably with the laterite, and newer than that which has just been described, rests in horizontal partial layers on the trap, of which it imbeds small fragments.

On approaching the sandstone ranges of Colabanghy and Gokauk, the hypogene schists are seen rising to the surface at their base, and the intervening limestone and its associated shales are wanting. The hill of Punchmi to the S. W. of the town of Gokauk has a base of garnitiferous gneiss, hornblende and chloritic schists, capped with sandstone in massive beds. These beds are interstratified with layers of conglomerate containing rounded and angular fragments of reddish quartz rock, quartz, and a greenish and grey chert. These fragments in many instances appear to have been deposited so tranquilly as to have been arranged agreeably to the laws of gravitation, and occur most frequently at the seams of the thick sandstone beds.

The hypogene rocks have a dip of about 60° towards the E. by N., direction of beds S. 5° E. The sandstone rests on it unconformably,

dipping but slightly in the same direction. A dyke of basaltic greenstone, of about five feet broad, penetrates the hornblende schist in an easterly direction, bifurcates at about the middle of the ascent from the N. E. and is lost in the substance of the rock.

Falls of Gokauk. The subordinate ranges of Gokauk and Cota-banghy now before us, form the eastern flank of the Western Ghauts, and run in a parallel direction, here about S. by E.. At Gokauk the upper portions of this range present mural precipices with either well flat tabular summits, or running in narrow crested ridges.

They are entered from the east by a picturesque gorge (cross valley), through which the Gutpurba hurries from its mountain sources into the elevated plains of the Deccan, near the town of Gokauk, which is about three and a half miles easterly from the falls.

The road lay along the bottom and side of this defile on the right bank of the river, which was now (July) swollen by the monsoon freshes from the Western Ghauts. It varied in breadth from 90 to 300 yards, presenting a rapid muddy stream, brawling and rushing from the alternate confinement and opening out of its rocky channel. It is unfordable generally during four months in the year at Gokauk, viz. from the middle of May to the middle of September, at the cessation of the monsoon. The water at the dry season ford, a little below the town, is now 15 feet deep. The sources are said to be near Bunder or Gunder Ghur, a little N. of the Ramghaut Pass from the S. Concan to Belgaum. After a course of about 100 miles, watering the plains of Kulladghi and Bagulcotta, it finds its way through the gaps in the Sitadonga hills just described, to the Kistnah, which it joins at the *Kudli Sunghum*.

After an hour's time spent in winding up this rugged defile, the falls, the roar of which we distinctly heard during the silence of night at the town of Gokauk, at a sudden angle of the road became partly visible, presenting the magnificent spectacle of a mass of water containing upwards of 16,000 cubic feet precipitated from the tabular surface of the sandstone into a gorge forming the head of the defile, the bottom of which is about 178 feet below the lip of the cataract. The Gutpurba a little above the fall is apparently about 250 yards across, but contracts to 80 as the brink of the chasm is approached; consequently the density and velocity of the watery mass is much increased, and

it hurries down the shelving tables of rock with frightful rapidity to its fall.

The fall over the face of the precipice seems slow and sullen from the velocity of the surface water of this rapid, and from the great denseness of the body; and it plunges heavily down with a deep thundering sound, which we heard during the previous night at our encampment, three and a half miles farther down the river.

This ponderous descent, and the heavy muddy colour of the water, conveys a feeling of weight through the eye to the senses, which is relieved by the lightness and airiness of thin clouds of white vapour and amber-coloured spray which ascend from the basin at the bottom of the gorge in curling wreaths, curtaining the lower portions of the fall, and through which the basin was only seen at intervals when its surface was swept by the fitful gusts that swept up the glen.

Rising above the cliffs that confine the falls, the watery particles vanish as they ascend; but again condensing, descend in gentle showers, which is felt at a short distance round the head of the falls.

Spray bows, varying in brightness, distinctness and extent, according to the quantity of light refracted, and the modification of the vapour, lent their prismatic tints to the ever-ascending wreaths; the largest, (observed about 4 P. M.) formed an arch completely across the river, rose, and receding as the sun sank in the west, gradually disappeared with it. Like the rainbow they are only produced on the surface of the cloud opposed to the sun's rays. The size and distance from each other of the drops composing the different portions of the spray cloud, evidently influenced the brilliancy of the refracted colours, the tints being brightest in those portions where the drops were of medium size and density, and duldest where the watery particles were smallest and closest together.

The velocity of the surface water of the rapid was about nine feet per second, and its depth ten feet. About two and a half miles farther up, the river near the village of Koonoor, beyond the rapid, is a ford in the dry season, and a safe ferry during the monsoon. A tumbler-full of the turbid water deposited 1-50th of its bulk of a fine reddish clay, not calcareous,—a fact showing that the lime which exists in the sediment of this river at its confluence with the Kistnah, must have been derived from the intermediate plains. The pebbles brought down are chiefly

quartz, granitic, and from the hypogene schists, with a few of calcedony; the sands containing grains of magnetic iron. The boiling point of water at the plateau of sandstone from which the cataract falls, gives 2817 feet above the level of the sea.

The mean temperature of the place, approximated by Boussingault's method, is 78°, which I should think rather too high, as the temperature of a spring close by was only 75°. Temperature of air in the shade at time 78°.

The mean temperature of Darwar, which stands much lower, is calculated by Christie at 75°.

The head of the fissure, which is elliptical in form, with mural sides of sandstone, has much the appearance of having been cut back, like Niagara, by the abrading action of the water, for the space of about 100 yards. Large rocks, with angular unworn surfaces, evidently dislodged from the rocks on the spot are seen in the bed, and on the sides of the river below the deep basin-receptacle of the fallen waters and on its margin. The great hardness and compact structure of the sandstone above the falls offers great obstacles to their rapid recession.

The cliffs, however, flanking the right side of the river below, are rent by nearly vertical fissures from summit to base, by one of which I descended to the bed. The direction of two of the largest was about E. S. E. They are crossed nearly at right angles by minor cracks which thus insulate portions of the rock. The bases of these tottering pinnacles are often undermined by the action of the water, and the mass tumbles headlong into the stream.

The sandstone in its lower portions is interstratified with layers of shale, the softness of which facilitates this process of undermining. These shales are of a purplish-brown and yellowish-brown colour, with minute spangles of mica disseminated, and between the laminæ contain incrustations of common alum (sulphate of alumina). The alum is earthy and impure, and sometimes has a mammillated surface resembling the alum incrustations in the ferruginous shales cresting the copper mountain near Bellary. It is found in considerable quantity in a small cave near the foot of the falls.

The ripple mark, so often seen on the sandstones of Europe, is observed in great distinctness on the tabular surfaces of the cliffs and in the exposed layers of the subjacent beds, at least 100 feet below the

surface. Its longitudinal direction is various, but generally S. 25° W., indicating the E. S. E. and W. N. W. direction of the current which caused them. The ripple marks on the sandstones of Cuddapah and Kurnool have a general similar direction.

At the bottom of the deep fissures in the sandstone cliffs already described, accumulations have formed of fallen fragments of rock, sticks and leaves, &c. from above, intermingled with the dung and bones of bats, rats and wild pigeons, with a few sheep and goat bones. Some of the latter have the appearance of having been gnawed by hyenas, jackals, or other beasts of prey. Many however are evidently the remains of animals that have fallen from above, as the bones are fractured.

The upper portions of these fissures have sometimes been choked by rock and rubbish from above. Their sides, though generally smooth, are marked with shallow polished grooves.

I made two excavations through the floor of the principal fissure, in the hope of meeting with organic remains, but in vain. After penetrating the surface layer of loose stones, and bats' dung, a fine red earth was met with, imbedding angular fragments of sandstone, and a few rounded pebbles of it and quartz. After digging for about four or five feet through this, farther progress was prevented by great blocks of solid rock.

The seeds of creepers and other plants vegetate on this soil, and shoot rapidly towards the surface, shading the fissures with their leaves.

On the cliffs near the falls, on the right bank of the river, stands a small group of Hindu temples dedicated to Siva. The principal shrine is a massive and elaborately carved structure of sandstone, elevated on a high, well built pediment above the reach of the ordinary floods.

Seven years ago, three of the steps of the northern flight ascending this terrace were submerged by an extraordinary rise of the river. The *Vimana* of this temple contains the Phallic emblem of Siva, the *Linga*, guarded by the sacred bull. Here we passed the heat of the day. On the opposite bank of the river rises a well wooded hill, about 100 feet above the brink of the rapid, on which stand a few ruins of other Hindu religious structures.

The table-land to the S. of the falls is covered with low jungle of Mimosa, Euphorbia, Cassia and Bunder, the *Mend bundati* with its lilac sweet pea-like blossom, the *Carissa spinarum*, *Webera tetrandra* and other thorny shrubs. The *Euphorbia antiqua* and *tortilis* were in flower, (July).

Tract between Gokauk and Belgaum, along the Western slope of the Ghauts. From the falls of Gokauk by Padshahpoor to the cantonment of Belgaum, about $34\frac{1}{2}$ miles, the route lies nearly S. W. across an elevated table-land sloping gently to the eastward, covered with alternating bands of red and black soil, generally well cultivated, and intersected from Padshahpoor, which is about $11\frac{1}{2}$ miles from the falls, to Belgaum by curvilinear spurs and outlying hills, belonging to the Western Ghaut system, consisting of sandstone and sandstone conglomerates as at Gokauk, in nearly horizontal strata. The ruins of the fort at Padshahpoor stand on a low flat-topped hill of this sandstone. This formation has been covered in two localities by the overlying trap. A little beyond the village of Kunnoor, about two miles from the falls, a narrow *coulee* of trap is crossed, containing olivine and dark glassy crystals of felspar.

About a mile to the N. E. of Belgaum, another sheet of trap is entered on, which extends to the sandstone ranges on the right. The sandstone is now finally lost sight of on the line of route, and the trap continues the surface rock to Belgaum, where it is covered by a thick bed of laterite, over which is in some places superimposed a layer of the more recent lateritic conglomerate.

Sections of these rocks are afforded by the quarries near the old European Barracks, none of which have been excavated to the subjacent trap. It has however been dug down to in some of the deepest wells of the place. The laterite is used here as at Malacca, Goa, and on the Malabar coast, as a building stone.

The trap in the vicinity of Belgaum rises into hills with rounded summits, covered in general with a dark, spongy mould, which is boggy during the monsoon, the grassy and almost treeless surface of which affords a strong contrast to the jungle-covered hills of sandstone to the N. W. The trap hills are rarely flat-topped, or in horizontal ranges,

as seen in the more central parts of its area. The trap at the summit of these hills is usually dark, compact, and basaltic, but occasionally contains almond-shaped and spheroidal cavities filled with calcedony and crystallized quartz, zeolites and green earth. Black crystals of augite are occasionally seen shooting through its structure, which decay sooner than the imbedding rock ; and, falling out in the state of powder, leave numberless cavities on the surface. The rock itself in weathering, resembles iron in rusting, and passes into reddish brown, or coffee-coloured earth, or clay. Cavities occasionally are seen filled with a black earth resembling black bole.

S. E. boundary of the overlying trap at Bangwari. This trap passing into amygdaloid and wacke, and covered with patches of laterite, extends about fourteen and a half miles S. E. from Belgaum, a little to the West of the village of Bangwari, though a few narrow slips are crossed a few miles farther East. The edge of the trap is seen reposing on the hypogene schists at the base of the trap hills close to the village, the ferruginous quartzites with veins of a diaphanous bluish quartz and hornblende schists, are here seen to basset out in nearly vertical strata.

From the Southern limit of the overlying trap at Bangwari to the Malpurba. A few hundred yards to the W. of the village of Hoobly, sixteen and a quarter miles S. E. from Belgaum, there is a low hill covered with alluvial soil, in which I found an angular block of quartz with a fibrous structure resembling that of silicified wood, but evidently not of organic origin. The exterior is brown and opaque ;—interior generally translucent with microscopic longitudinal cavities. Minute longitudinal fibres of talc are discoverable with the aid of a lens, having a parallel direction with those of the fibres of quartz, and I have little doubt that the rock owes its fibrous structure to the presence of talc. I have observed a similar structure in the quartzite associated with the talcose and actynolitic schists of Mysore.

Malpurba River. About three-quarters of a mile from Hoobly the Malpurba is crossed. It was swollen by the monsoon (July) and unfordable, having about eighteen feet of water in the main channel. Rate of surface current, two and a half feet per second. Its breadth by a trigonometrical observation ninety-five yards. A tumbler-full of the water

deposited a scanty sediment of fine red silt, about 1-50th part of its bulk. The temperature of the water a foot below the surface was 74° , of air in shade 72° , of a well thirty feet deep $74^{\circ} 5'$. The temperature of rain water 73° . (The atmosphere had then been cooled to 70° and 74° by eighteen days of successive rain, with a pretty steady westerly wind). The banks of the river are of silt and sand, the left or Western bank is steep and high.

From the Malpurba to Darwar. From the banks of the Malpurba to Darwar, a direct distance of twenty-three miles, the country is hilly and picturesque, particularly around the Marhatta forts and towns of Kittoor and Taigoor, which command a lovely *landscape* of hill and dale. The valleys are generally well watered, cultivated with dry and wet grain, and studded, parklike, with clumps of the Mango and Tamarind, while the sloping sides of the hills, verdant with the rain, afford a plentiful pasture to flocks of sheep and herds of cattle. The landscape around Darwar partakes of the same character, and was frequently brought to recollection during subsequent wanderings in Karamania, the Troad, and other parts of Asia Minor.

The soil covering the surface of this pleasing tract of country, is usually reddish, and the result of the decay and washing of the neighbouring rocks. A few belts of cotton soil appear here and there. The staple products of these soils are rice, yellow and white Juari, Bajra, Raggi, Teimgoni, Till, Tobacco, Saffron, and Maize; Mimosa, Euphorbia, Cacti, Cassias, and Acacias constitute the majority of the wild vegetation.

The schists forming the hills in the vicinity of Kittoor resemble, petrologically, the jaspideous schists of Bellary and Sondur (described in Madras Journal for July 1838, pp. 147-49,) and consist commonly of chert and brown iron ore, or a ferruginous jaspideous clay in alternate layers; sometimes in straight lines, sometimes in flexures contorted, or bent at acute angles, and resembling those of ribbon jasper. This rock, like that of Sondur, is sometimes magnetic with polarity. It contains nests and cavities lined with blistery and stalactitic hematite, quartz crystals, and veins of smoky quartz. In some places, like the Sondur rock, it puts on the appearance of a breccia consisting of a dark chocolate, or liver-brown paste, highly indurated, giving fire with steel, imbedding angular fragments of the striped ribbon jas-

per-like variety, and appearing, as Christie justly describes, as if the latter rock had been broken into a number of small angular fragments, which had been afterwards united by the consolidation of the brown variety. I have seen this singular phenomenon most beautifully exhibited in some specimens of a continental agate breccia in the collection of Mr. Robert Brown, the celebrated botanist, where angular fragments of beautiful jasper and agate are united together in highly transparent quartz. The pieces of agate and jasper must evidently have been once continuous, and re-united on the spot where they were fractured; since, in most instances, the sides of the fractured portions are sharp and angular, and could be refitted into each other with perfect exactness; some are only separated a tenth of an inch by the transparent medium in which they are set. The differently coloured bands identify the fractured portions as having once constituted one integral piece of jasper or agate.

If the reader can imagine a flat piece of ribbon-jasper or agate laid down upon a table, and both broken, so that the fractured portions shall not be scattered widely from their neighbours, and a layer of molten glass carefully poured over them, he may form an idea of the appearance of these beautiful breccias. He must not expect, however, to see such regularity in rocks on the large scale.

Towards Darwar the schists pass into chloritic and argillaceous slates and shales, of all shades of white, yellow, red, brown, and green; interstratified with beds of quartz rock, and the jaspideous rock just described, which generally forms crests and mural ridges on the summits of the hills. The latter is often found in irregular masses, obscurely stratified; but, in most cases, as remarked already, in regularly interstratified beds with the clay and chloritic schists conformable both in dip and direction.

The lustre of this rock is sometimes equal to that of pitchstone, and sometimes dull and earthy; the fracture flat conchoidal, in the more compact varieties; splintery and slightly granular in the less compact. The Kittoor and Darwar schists bear evident marks of the alternation produced by the intrusion of granite, and trap dikes seen occasionally at the bases of these hills; and as in the Ceded Districts, and other localities on the hypogene area, of Southern India, affords striking illustrations of the correctness of McCulloch's remark on the formation

of jasper rock,* viz. "where strata of quartz rock, containing much felspar or clay occur in contact with granite, they pass into jasper if the clay abounds; while in other places they are converted into chert if less of that earth is present; or, if pure, are rendered perfectly crystalline."

With regard to the classification of jaspideous rocks associated with the metamorphic schists of S. India, it is clear they either belong to the jasper rocks, or silicious schists of McCulloch, both of which, however, I have reason to think, pass occasionally into each other. Both occur in strata among the metamorphic rocks; jasper sometimes forming hills in Siberia and Norway, and it is seen in Scotland and the Appennines imbedded in micaceous and argillaceous schists.

The difficulty that sometimes exists of distinguishing these two rocks has not escaped the notice of McCulloch, who thus remarks: "Jasper presents a few modifications of internal structure which require notice. It sometimes gives indications of a spheroidal concretionary disposition, more or less perfect, and resembling that which, under circumstances of a similar nature, occurs in chert and silicious schist. In the same way, it sometimes possesses a laminar structure, and in this also it approximates to the silicious schists. It is easy to see how from similarity of origin, connexion and composition, it may be thus a matter of doubt to which of those two rocks any given specimen or bed should be referred. The well known striped and spotted jaspers owe their appearance to the two structures above-mentioned, and occasionally the two are combined in the same specimen."

There is however a perhaps somewhat empirical distinction drawn by some geologists between these two classes of rocks, founded upon the supposed less stratified character of jasper, its intrusion into other rocks in the state of veins, and its association with trap rocks, which I will avail myself of to place, pro-tempore, the jaspideous rocks of Southern India among the silicious schists; from their, in general, decidedly stratified character, particularly those of the Southern Marhatta country, which pass into the associated schists, and preserve a conformable dip and direction. The petrographical characters of the Marhatta beds, varying according to the degree of induration, and

* Classification of Rocks, pp. 546-47.

structure, on the whole less assimilate those of jasper than in Sondur and other places. The generality of its most jaspideous and laminar beds may be classed in McCulloch's second division of silicious chert, viz.

"F. Laminar, with alternate colours, and forming varieties of the striped jasper of mineralogists. The colours are commonly shades of red, brown, yellow and purplish black, and these kinds appear to be derived from the coloured shales.

"G. Containing imbedded crystals of quartz, and of a porphyritic aspect."

The physical aspect of the country to the W. and S. W. of Darwar is hilly. The elevations are generally, like those of the clay slate of the Cambrian group, round-backed, smooth, of no great altitude, and separated by well cultivated vallies, or narrow ravines. They are partially covered with a low shrubby vegetation principally of *Mimosa*, *Cacti*, and the *Cassia auriculata*. To the East stretches the great plateau of the S. Mahratta country and Ceded Districts, covered for the most part with a thick layer of *regur*, and continuing, with but few hilly interruptions, across the peninsula to the Eastern Ghauts. The soil in the immediate vicinity of Darwar is reddish and clayey, evidently the alluvium of the schistose hills, and disintegration of rocks in *situ*.

The rocks composing the hills are schists passing into slates and shales, (agreeably to Lyell's distinctions of these terms.) The general structure is perhaps more schistose and shaly than slaty. The structure varies from massive, and obscurely slaty, to finely laminar; and from compact and flinty, to soft and sectile. The laminæ are nearly vertical, and generally run parallel with the prevailing line of elevation, viz. N. W. and S. E. The stratification, if not identical with the lamination, is obscure. It is well known, however, that the lines of fissility in slates are not necessarily those of stratification, the former being often caused by the arrangement of mica, chlorite or talc; petrographically speaking, the rock passes from a green chloritic schist into all shades of white, yellow, red and brown, sometimes singularly arranged in stripes, in contorted and waving bands; red and white being the prevalent tints. Felspar, in a clayey slate of disintegration, is the prevalent mineral blended with quartz, and tinged with iron. The white

varieties seldom contain silex sufficient to give them the character of *Kaolin*. The whole mass is sometimes reticulated by veins of a brown ferruginous quartz and impure iron ore, (often split in the centre, and the sides of the fissure lined with quartz crystals) having apparently no decided direction. Iron pyrites are seen in the chloritic schists; this rock, particularly in the vicinity of trap dykes, has a tendency to the prismatic and rhomboidal forms, in which the lamination, though generally obscure, is sometimes still distinctly traceable. A system of joints running nearly at right angles with those of lamination, often intersect the whole group of these schists. These jointed portions are not capable of that indefinite subdivision into similar solids by which Professor Sedgwick justly observes, the true cleavage planes may generally be distinguished from the joints. The difficulty in the schists of the S. Mahratta country is to discriminate between the planes of cleavage, and those of mechanical deposition, or chemical precipitation, for which there are three good tests, viz. the interstratification of another bed of rock, the coloured bands of successive deposition, and a peculiar, but slightly dimpled appearance on the surfaces of the planes never seen on those of cleavage. From the occurrence of the latter on the planes of the laminæ of the Darwar rocks, and from the iron and dip of the large interstratified beds of quartz and silicious schists, I am inclined to consider that the true lines of stratification run nearly parallel with that of elevation, viz. nearly N. W. and S. E., and that the laminæ are those of deposition; while the microscopic fissures by which the rock is cleft into rhomboidal and prismatic forms may be received as those of true cleavage.

My friend Captain Allardye, who has minutely examined the rocks about Darwar, writes me that the direction of the laminæ and that of stratification keep very constant to one point of the compass, viz. N. W. by N. for a great distance, perhaps over an area of from fifty to one hundred miles. One may pick up a fragment of chlorite slate of a triangular, pyramidal outline, the external planes of which will be ferruginous, while the interior is divided into minute laminæ *not* ferruginous, and coincident with only one of the planes. On examination of the rock in situ, this minute lamination is found to be vertical, and invariably divided N. W. by N., conformable, in short, to the line of elevation. The chloritic schist N. of Darwar is of a bluish green tinge,

greasy to the touch; and sometimes so massive in structure as to make an excellent building stone, although it rarely loses its slaty fracture. Thin pieces, *per se*, before the blow-pipe, fuse partially on the edges into globules of a greenish-coloured enamel.

It is often intersected by ferruginous quartz veins, or rather layers, that, penetrating the lateral joint seams, and the almost vertical layers of stratification, divide the rock into cuboidal masses. Veins of a reddish grey or white kunker, both friable and compact, occur.

Country S. of Darwar to the Mysore and Canara Frontiers. From the hills of Darwar to the Mysore frontier near Bunwassi and Chundergooty, the face of the country presents a plain diversified with a few mammiform and smooth conoidal truncated hills, which do not rise to any considerable height. The soil is generally reddish and alluvial, crossed in an easterly direction by narrow belts of cotton soil. The formation is much the same as at Darwar. Dykes of greenstone and beds of kunker now become more frequent. A large deposit of the latter is crossed on the road between the old town of Hoobly and the German mission house, about fifteen miles S. E. from Darwar. The wells near are often brackish, and so deep as seventy feet. Both Hingari and Mungari crops are cultivated. Rice too is grown in some of the moist, shallow vallies and flats below the small tanks, which now become more numerous.

Bunwassi and Mysore Frontier. Towards Bunwassi quartz rock prevails with greenstone dykes, having a general easterly direction often covered by beds of laterite and lateritic conglomerate imbedding fragments of quartz rock in a cellular brown ferruginous paste. This rock has been employed in the construction of the wall enclosing the quadrangle of the ancient temple and the old temple at Bunwassi. A little farther South rises from the schists the lofty rock of Chundergooty in Mysore, a mountain mass of granitoidal gneiss divided by vertical and almost horizontal fissures.

From Bunwassi to Gudduk. From Bunwassi, E. N. Easterly to Savanoor, the chloritic and coloured schists and slate clays continue. Near the latter place dykes of greenstone become more frequent, accompanied by depositions of *kunker*, which is seen filling fissures in the schists, and overspreading their surface beneath the alluvial soil. The direction of the beds at Savanoor suffers a deflection after

leaving Darwar of about 40° , being nearly due N. and S., dipping at an angle of about 40° towards the East. They terminate on the N. E. between Savanoor and Gudduck, close to Lackmaisir. Here a spur from the principal N. and S. line of elevation runs nearly E. and W. dipping towards the S.; several similar spurs are crossed between Bunwassi and Lackmaisir; the dykes of greenstone run in a similar direction. The schists, in the vicinity of the dykes, are indurated, silicious, and often abound with iron. Crystals of liver and brass-coloured iron pyrites are scattered through its structure; cotton soil alternates in these strips with the red clayey alluvial soil; it was first observed W. of Bankassur, near which the vegetation peculiar to the W. Ghauts terminates rather abruptly.

At Lackmaisir, gneiss is seen on the bank of a nullah running nearly E. and W. with a dip of 35° towards the S., and farther N. it rises into a low round backed ridge. Proceeding still more N. granite occurs in low bosses and detached blocks, and rises into a few clusters at the town of Kul Mulgoond. Near Hurti, on the S. flank of the Kupputgode range, resting on the gneiss, is a hill of mammiform shape, having its surface covered with detached, angular, and rugged masses of a calcareous rock, which appear to have been subjected to the action of violent disruptive forces. It is very liable to be mistaken, from the colour, hardness and granular texture, for a variety of the massive chlorite schist we have just left behind; and in some hard specimens it resembles diallage and serpentine. The mass of it however, on the application of a lens, clearly exhibits its true aggregate character: it is composed of minute angular fragments of a dark glistening quartz, and crystals of a pale flesh-coloured felspar, cemented by a greenish, granular subcrystalline paste, composed principally of carbonate of lime, and containing disseminated scales of mica. The application of dilute nitric acid to the rock excited but a feeble effervescence; but from the powder, the extraction of carbonic acid gas was abundantly evident. Like the chlorite slate, it imbeds cubical, brass, and liver-coloured iron pyrites. Before the blow pipe, *per se*, it phosphoresces slightly, and exhibits, on thin edges, shining points of black enamel. The compact varieties of this rock are susceptible of a high polish, and are used for ornamental architecture. Some of the finely polished slabs in the

elaborately sculptured mosque in the town Lackmaisir appear to be of this stone, retaining, like lapis lazuli, the pyrites which shine like so many spots of gold in its polished surface. In weathered surfaces of the rock these crystals are often seen projecting. It is not unlike some varieties of the celebrated calcareous *breccia di verde* of Egypt.

From its massive character, and want of a proper section, I could not find whether it was interstratified with the gneiss, or rested unconformably upon it. Gold-dust is found in the Nalas of Hurti, of Soltoor, and of Chick Mulgoond.

Beyond this singular hill runs a dyke of greenstone E. by S., which is crossed on the road, and also a range of chlorite and clay slate hills crested with ferruginous silicious schist, having a similar direction. Passing this, the country slopes northerly to Gudduck where gneiss and felspar rocks continue.

From Gudduck E. to the Ceded Districts, and N. to Gujunder Ghur. From Gudduck easterly to the Tumbuddra and the Ceded Districts, the formations consist of gneiss, hornblende slate and granite; and from Gudduck westerly to Darwar, first gneiss and hornblende slate; succeeded, about seventy or eighty miles E. of Darwar, by chlorite and coloured schists and shales. North of Gudduck the hypogene schists and granite extend to Gujunder Ghur, where they are covered by the sandstone beds.

Kupputgode Hills. The Kupputgode range presents an example of one of the crop dislocations which traverse the table-land of the peninsula in a direction from, E. by S. to E. S. E. often influencing the courses of the large rivers which, rising in the Western Ghauts, flow over the table-lands through gaps in the Eastern Ghauts to the Bay of Bengal. It commences a little south of Gudduck, and proceeds in a curvilinear direction easterly, until a little W. of the village of Kuddumpore where it bifurcates; the principal branch taking a S. 25° E. direction to the Toombuddra, which flows through a wide gap, and is continued into the Ceded Districts by Harponhully. The northern branch pursues an easterly course towards Dummul, where it traverses a wide plain extending as far as the eye can reach to the N. E. The strata dip near Gudduck towards the N. at an angle of 35°. Those of the southern chain, below the bifurcation and change in the direction,

dip E. 20° N. direction of strata S. 20° E. The dip frequently varies with the flexures and contortions into which the hypogene schists have been thrown. In one of the highest peaks it appeared quâ quâ versal; and near the temple to Kupput Iswara, whence the range derives its name, I found the dip to the S. W.

An immense dyke of basaltic greenstone emerges from the base of the strata near the point where the range suddenly bifurcates, accompanied, as usual, by large deposits of *Kunker*, which fill most of the seams and fissures in it and the adjacent rock. Considerable tendency to silicification is observed; the schists are profusely veined with quartz of different hues, white, pinkish, and diaphanous blue, reddish, smoky and black; seams and large veins of basanite also occur.

The Kupput hills are principally composed of hornblende and chloritic schists, gneiss and mica slate; large interstratified beds of silicious and ferruginous schists, as at Darwar, often forming thin ridges; seams and thin beds of a crystalline white marble occur; which, near their junction with the hornblende slate, are often coloured green. On the flanks of the range, at the base, gneiss invaded by granite is seen, both quartzose and feldspathic, containing rose-coloured quartz and felspar. Near Dummul the gneiss is often so much weathered as to resemble sandstone; schorl and actynolite are usually seen in the quartz veins, which intersect it. The dip of the gneiss is nearly vertical at Dummul, in other situations it varies almost to horizontal; some of the hills are capped with laterite, resembling that of Sondoore. The beds of the Dhoni rivulet, which has its rise in these hills, contain gravel and sand, in which gold-dust is found associated with magnetic iron sand, menaccanite, iron ore, grains of platinum, grey carbonate of silver, grey carbonate of copper, &c. Manganese is also found in considerable quantities. Tippoo excavated pits for gun-flints, of which I have given a description elsewhere.* Potstone occurs with the talc schist in this vicinity, and is used by the natives in sculpture, for cooking vessels, and for giving a smooth surface. The occurrence of gold, silver, copper, platinum, and manganese seems to have escaped the observation of Christie, Marshall, and other writers on the

* Madras Journal of Literature and Science for January 1840, p. 42.

S. Mahratta country; and there doubtless exist many other minerals in its rocks now unknown, but which the researches of other and abler pioneers than myself, and with more leisure, will not fail to elicit.

Geographical position and extent of the various Rocks of the S. Mahratta Country.

Hypogene Rocks. Commencing on the South, we find the greater portion of our area occupied by hypogene schists and argillaceous shales and slates, reaching on the North from Gujunder Ghur from the edges of the limestone and sandstone tracts; and at Bangwari, fifteen miles S. E. from Belgaum, basetting from beneath the overlying trap whence they extend by Darwar and Kittoor, forming the base of the Western Ghauts, and underlying the laterite of North Canara to the Sea on the West, stretching into Mysore on the South, and into the great plains of the Ceded Districts and Hydrabad on the East.

Near the N. W. angle they are seen outcropping from the sandstones near Gokauk as a *salbande* at the edges of the overlying trap formation along the N. bank of the Kistnah, in narrow zones along the Western base of the Sitadonga hills. They are seen with granitic rocks on the summit of the Ramghaut, and below it hornblende schist occurs on the sea shore at Vingorla.

Extent of the Limestone and Sandstone Beds.

The Limestone. The Southern boundary of the limestone and its associated shales has not been traced with accuracy, but we find it four or five miles S. of Kulladghi.

On the North Eastern extremity it emerges from the overlying trap near Talicotta, is capped by sandstone at Mudibhal, but re-appears in the valley of the Kistnah at Chimlaghi. A little to the S. W. it is again overlain by the great mass of sandstone forming the Sitadonga hills, but again is seen forming for the most part the base of the great plains of Kulladghi and Bagulcotta, and stretching to the West to the sandstone ranges of Gokauk and Padshapoor which bound it to the West, while the northern edge is fringed irregularly along the banks of the Gutpurba by the overlying trap.

Extent of the Sandstone. The sandstone and conglomerate ranges usually skirt the great limestone plains as the sand and gravel shores

environ the bed of some dried-up inland sea, and this appearance is heightened by the bold, flat-topped headlands and receding bays presented by the sandstone ranges in their curvilinear outline. This continuity of these long horizontal ranges, which usually preserve an uniformity of height, rarely exceeding 300 feet, has however been greatly violated by, apparently, denudatory aqueous causes; and it is not uncommon to see outlying masses and short ranges of sandstone at considerable distances from the principal deposit, for instance the detached rocks of Noulgoond, Pedda and Chick Nurgoond, (where it occurs in scarped masses cropping granite and the hypogene schists,) and the detached central range between Kulladghi and Gokauk.

The Sitadonga hills form the eastern fringe to the district, and those of Gokauk the western, extending southerly from its northern limits on both sides of the limestone plain of Kulladghi and Bagulcotta to about the latitude of the Malpurba river. The subjacent limestone thins out, or is entirely wanting at the edges, where the sandstone is often seen resting immediately on the granite and hypogene schists. The eastern ridge of sandstone turns westerly near Gujunder Ghur.

Extent of the Laterite. Laterite is seen capping some of the sandstone hills of the Sitadonga range, and a narrow belt along its eastern flank. It also occurs in the form of low hills and patches overlying the limestone in the plains of Bagulcotta and Kulladghi.

In the Southern parts of the district it occurs in a few patches covering the hypogene schists of the Kupputgode range, and on the summits of the Ghaut ranges West of Belgaum and Darwar.

Extent of Kunker. Kunker is pretty generally distributed; there are beds near Badami and Hoobly, of some extent, covered by alluvium.

Extent of the Regur. This remarkable soil, or deposit, for so I consider it, resembles much the *Tchornoi Zem* covering the steppes of Russia; it prevails almost exclusively in the plains East of Darwar, and those of Kulladghi and Bagulcotta, except where interrupted by chains of hills, and covered by the alluvium washed from their sides, in beds from a few inches to thirty or forty feet deep.

Extent of Plutonic and Trappean Rocks. Plutonic rocks are rarely seen developed in any extent on the surface of the South Mahratta country, but their effects are sufficiently apparent in the altered state of many of the lower rocks.

Granite is seen in bosses and rocks near Lackmaisir, at Gujunder Ghur and Noulgoond, underlying the sandstone at Mulgoond, in the gneiss of the Kupputgode hills, at Gudduk and Dummul, and in the districts bordering on the Tumbuddra and East of Gujunder Ghur.

The largest dykes of basaltic greenstone, which I observed, were at the West base of the Sitadonga hills, and in the Kupputgode range.

Extent, &c. of Overlying Trap. The southern margin of the great sheet of overlying trap, which overspreads almost the whole of Central and Western India and the Concan, runs across the northern part of the South Mahratta country, covering all rocks except the laterite, kunker, and regur, all which overlie it: entering from the Nizam's territories by Firozabad on the Bhima, it descends to the Kistnah near Churilaghi, near its confluence with the Gutpurba and follows with some irregularities the northern bank of the latter river by Kotabangy, a little to the N. of the falls of Gokauk to the W. Ghauts and the sea, which it reaches a little N. of Malwan.

The narrow zone of oliviniferous trap, crossed between the falls and Koonoor, possibly connects the outlier of this rock on which Belgaum stands with the main *Coulee*.

North of the Kistnah the trap spreads over the Kolapoor, Sattarah, and Poonah countries; to the N. E. it covers the plains of Bijapore and the Nizam's territories, stretching towards Gwalior. Where the trap terminates to the W. of Belgaum is not exactly ascertained, as the summits of the Ghauts near the Pass down to Vingorla are composed of granite and the hypogene schists; but the river Gutpurba, as has been observed already, brings down a few calcedonies to the falls of Gokauk. The amygdaloid noticed at Bangwari, and in the vicinity of Belgaum, appears to have escaped the observation of Christie, who states he has not seen this rock *in situ*.

Classification of the Rocks of the South Mahratta Country.

Christie, partly adopting the Wernerian system, has classed the rocks of the South Mahratta Country under five heads, viz:

- 1st. Granite.
- 2nd. Transition Rocks.
- 3rd. Old Red Sandstone.
- 4th. Secondary Trap.
- 5th. Alluvial.

Under the head of Transition he has included the gneiss and talc schist of Dammul, Nurgoond and Gairsuppa. The chlorite and clay slates, silicious schists and quartzite of Darwar, Kittore, and in short, the schists of the whole of the central and southern parts of the Darwar districts, together with the limestone of Kulladghi and Bagulcotta.

Some clay slates associated with these limestones he has classed among the grauwacke group, and the sandstone with the old red sandstone.

This classification has been apparently grounded on mineral resemblance of the schists to the transition rocks of Werner, their in general highly inclined strata, and on the circumstance of the sandstone resting, in some localities, on the schists in unconformable, and almost horizontal stratification. These facts, without the additional evidence of organic remains, and in the total absence of any associated stratum the age of which has been distinctly ascertained, would hardly be deemed by geologists of the present day, sufficiently conclusive to warrant the rocks of the S. Mahratta country being referred to the same epochs as the transition, grauwacke and old red sandstone rocks of Europe, as now defined.

Werner, in his improvement of the system of Lehman who divided rocks into three classes, viz. :

1st. Primitive : comprising plutonic or granitic rocks, and the hypogene or metamorphic schists formed with the world, and containing no fragments of other rocks ;

2nd. Secondary : including the aqueous and fossiliferous strata which resulted from the partial debris of the primitive rocks by a general revolution ;

3rd. Alluvial : comprehending the debris of local floods and of the Deluge of Noah—

intercalated a 4th class between the 1st and 2nd class, and under this head he placed a series of strata, which he thought formed a passage between Lehman's primitive and secondary rocks, hence called transition, assimilating on the one hand to the crystalline structure of mica, and clay slates, and on the other, evincing traces of a mechanical origin, and organic remains. These beds were chiefly of clay slate arenaceous rock, coralline and shelly limestone, and grauwacke, a grey argillaceous sandstone, often schistose, imbedding small fragments of quartz, flinty slate, or basanite, and clay slate, cemented together

by argillaceous matter. Werner, in the confined space that fell under his observation, found both the primitive and transition schists highly inclined, while the newer aqueous or secondary beds were horizontal; hence his too hasty generalizations. It is now ascertained that secondary strata and green tertiary beds are often found in nearly vertical position, and that some granites are newer than the lias and chalk; on the other hand, gneiss is often seen in horizontal beds, and Mr. Murchison has lately discovered in Russia the older stratified rocks extending in horizontal unbroken masses for the distance of nearly one thousand miles. The value of mineral character unsupported by others, is of small value as a test of the relative ages of stratified rocks; we see lacustrine strata of the Eocene period identical in all their mineral characters with the secondary new-red sandstone and its associated marls, and certain arenaceous beds in the cretaceous formations of the Alps, and even in some tertiary deposits, which can hardly be petrologically distinguished from the rocks of the grauwacke group.

Although it is quite possible that future discoveries may prove the sandstone to be equivalent to the old red, and many of the rocks, classed as transition, really to belong to that period? yet I consider it preferable, for the present, to arrange the rocks of the S. Mahratta country agreeably to the acknowledged geological evidence they themselves exhibit, in addition to that of a mineral character, viz: superposition, imbedded fragments of older rocks, intrusion with or without alteration, conformable or non-conformable stratification, and this with little reference to European formations. The classification will therefore, for the most part, be that of relative age. Not a single organic remain, I may observe, has hitherto been discovered in the most recent deposit in the S. Mahratta country to assist us to any conclusion, except recent terrestrial and fresh-water shells in the newer kunker.

The stratified rocks will be classed in the ascending order, commencing with the hypogene, or lowest series. The plutonic and trappean rocks will succeed.

Age of Hypogene Rocks. The hypogene schists are evidently the lowest in the group of normal rocks, and have suffered the greatest disturbance as already observed. The lowest member in this series is usually gneiss, and the highest either marble or clay slate: but there are many exceptions to this remark.

Age of Limestone. Christie has classed with the hypogene schists under transition, the limestones of Kulladghi and Bagulcotta; but from extensive observation of this rock, here and in other parts of India, I am inclined to think it, with its associated slates and shales, of more recent origin, principally from its resting on the gneiss, &c. in usually unconformable stratification, often dipping but a few degrees over large tracts, and its more intimate association with the sandstone which caps it; these rocks being usually seen together. The limestone is inclined near Kulladghi at an angle of 25° , but this disturbance is confined to areas of small extent, speedily recovering its usual little inclined position. In some localities, as near Ryelcherro and Juldroogum in the Ceded Districts, it is seen to alternate with the sandstone. Traces of coal have been discovered in a limestone in the Hyderabad country, which appears identical with the Kurnool and Kulladghi limestones.

Sandstone. The sandstone, though sometimes alternating, and often in conformable strata, with the limestone, is on the whole less disturbed, as just observed; and generally appears in almost horizontal strata, particularly in the hills south of the Malpurba. On the north bank of this river the sandstone beds have suffered more disturbance, and Christie observed them dipping at an angle of 40° to the N. W. at Chick Nurgoond, resting on vertical hypogene schists, (talc slate). In the N. E. portion of the district the sandstone of the Sitadonga hills rests on vertical chlorite and silicious schists, with a dip towards the N. E. varying from 5° to 28° . In the N. W. portion, near Gokauk, the stratification is obscure, the beds appearing as thick and nearly horizontal tabular masses. Where the strata are horizontal, the hills which they compose run in long, low, flat-topped, wall-like ridges terminating like trap elevations rather abruptly, and their sides often presenting mural precipices. These ranges usually run in corresponding elevations, averaging about 200 feet from the surface of the plain. The maximum thickness of the deposit perhaps does not exceed 400 feet.

From their being sometimes in unconformable stratification with the limestone, and imbedding fragments of its cherts, it might be inferred that an interval of plutonic disturbance took place between the periods of their deposition; though we have not as yet sufficient evidence to refer them to two distinct geological epochs. Basanite,

quartz, hornblende, actynolite, and other of the hardest fragments of the hypogene and granitic rocks are occasionally seen in the sandstone, but rarely pieces of gneiss or of the granite mass itself,—a circumstance indicating great trituration of its components prior to consolidation. With regard to mineral character, the limestones and sandstones of the S. Mahratta country resemble those of the Devonian groupe perhaps more than any other, but it has been already remarked what little reliance is to be placed on this test of the age when unsupported by other evidence; more particularly as organic remains have been discovered in the sandstones of Hyderabad and Nagpore, supposed to be identical with those of the S. Mahratta country, which would indicate a more recent era. These fossils are a hollow compressed body, of a deep black colour and compact structure, the centre of which is filled with sandstone, and supposed to be a vegetable by Mr. Malcolmson, who discovered it in the sandstone hill of Won. The others from the sandstone in the vicinity of Nagpore were discovered by Lieutenant Munro, H. M. 36th, and are impressions of plants which resemble the *Glossopteris Dancœoides* of the Burdwan coal field, as figured by Royle. With these plants impressions were found, which Mr. Malcolmson conceives to be not unlike those of the large bony scales of the sauroid fish of the carboniferous and old red sandstone rocks, especially those of the latter. Mr. Malcolmson showed me these specimens at Bombay, and I agree with him that these last impressions were too imperfect to justify any opinion as to their real nature. As he justly remarks, in a subject so new, and I may add as likely to afford so important a key to the classification of the rocks of India with those of Europe, no indication should be overlooked. The occurrence of a *Glossopteris* in strata imbedding organic remains of the Devonian groupe, would be novel and interesting.

I am not aware that the diamond, a marked mineral characteristic of the sandstones of the Ceded Districts occurs in the Eastern Ghauts from the Pennaur to north of the Kistnah, and which as far as a peculiar mineral characteristic can perhaps identify rocks, identifies it with the diamond sandstones of Nagpore, in which the fossils alluded to as discovered by Mr. Munro occur, and those of Punnah in Bundelcund, has hitherto been discovered in the sandstone of the S. Mahratta country. A bed of anthracite three feet broad and 200 feet long, has

lately been discovered in the sandstone of the Goond country, and traces of it exist in the sandstone N. W. of Nagpore.

Laterite. Next in order of superposition to the sandstone comes the overlying trap; but adopting the arrangement of Lyell, I shall place it and the granitic rocks apart from those that have a confessedly bedded structure.

Laterite was classed both by Voysey and Christie with the overlying trap; by the former as a volcanic rock. Christie has not given an opinion as to its origin. It has been thought of volcanic origin, principally from its apparently unstratified and non-fossiliferous character, and being frequently associated with trap rocks. It however occasionally possesses a distinctly stratified and conglomerate character, and passes into a loose coarse sandstone, as at Pondicherry, imbedding silicified wood, and at Beypoor, on the Malabar Coast it passes into a loose sandstone imbedding layers of lignite. General Cullen was the first to discover lignite and carbonized seeds in the laterite of Quilon and Travancore. He now writes me, that he has discovered extensive beds of lignite in the laterite formation of these provinces.

Some geologists suppose it is the result of the weathering still in progress of granitic and trap rocks *in situ*. The fact of its imbedding rolled fragments of sandstone when resting on granite, and the beds of lignite and silicified wood it contains, militate strongly against this theory: and independently of these facts, nothing is more common in lateritic tracts than to see a hill of trap or of hornblende, gneiss or other hypogene schists capped with a thick bed of laterite, while the adjacent hill, composed of an exactly similar rock, and equally exposed to the action of the weather, is quite bare of laterite. I have examined beds of laterite resting on trap and amygdaloid imbedding calcedonies and jasper, but have not hitherto detected in the former any fragments of these tough silicious minerals, which are found to resist successfully even the attrition of the most rapid streams of India, long after the imbedding trap has disappeared and been lost in alluvial sands, and carried across the Peninsula into the bed of the ocean.

Their occurrence, however, particularly at the point of contact, would not prove that the laterite was formed from the upper portions of the subjacent trap weathered *in situ*. A detrital and mechanical origin like that of the sandstone, would carry into it the harder un-

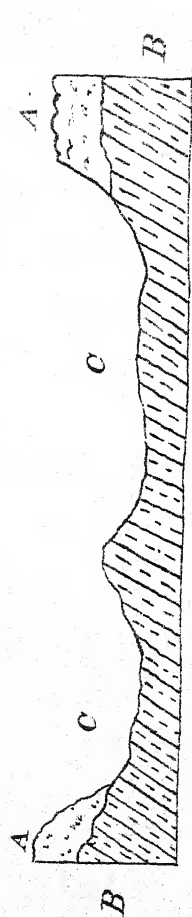
weathered nodules of the rocks from which it was derived. I have also seen laterite resting on limestone without a traceable particle of lime in its composition. This could not have been limestone weathered in situ.

The fact of one hill being capped with laterite, and its neighbour being left bare, is a circumstance also militating against another theory adopted by some Indian geologists, viz. that of its alluvial origin from causes now existing. It is impossible to see the laterite capping in tabular strata, as at Beder, hills of trappean or hypogene rocks separated by vallies, wide plains or elevations, in which nothing but the latter rocks are seen, without coming to the conclusion that the beds of laterite were once continuous over these spaces, and stripped off by waters of which nothing but the trace of denudation now remains. Natural sections often remind one forcibly of that striking instance of denudation of the red sandstone, on the N. W. coast of Ross-shire given by McCulloch in his *Western Isles*, Vol. II. p. 93, pl. 31, fig. 4.

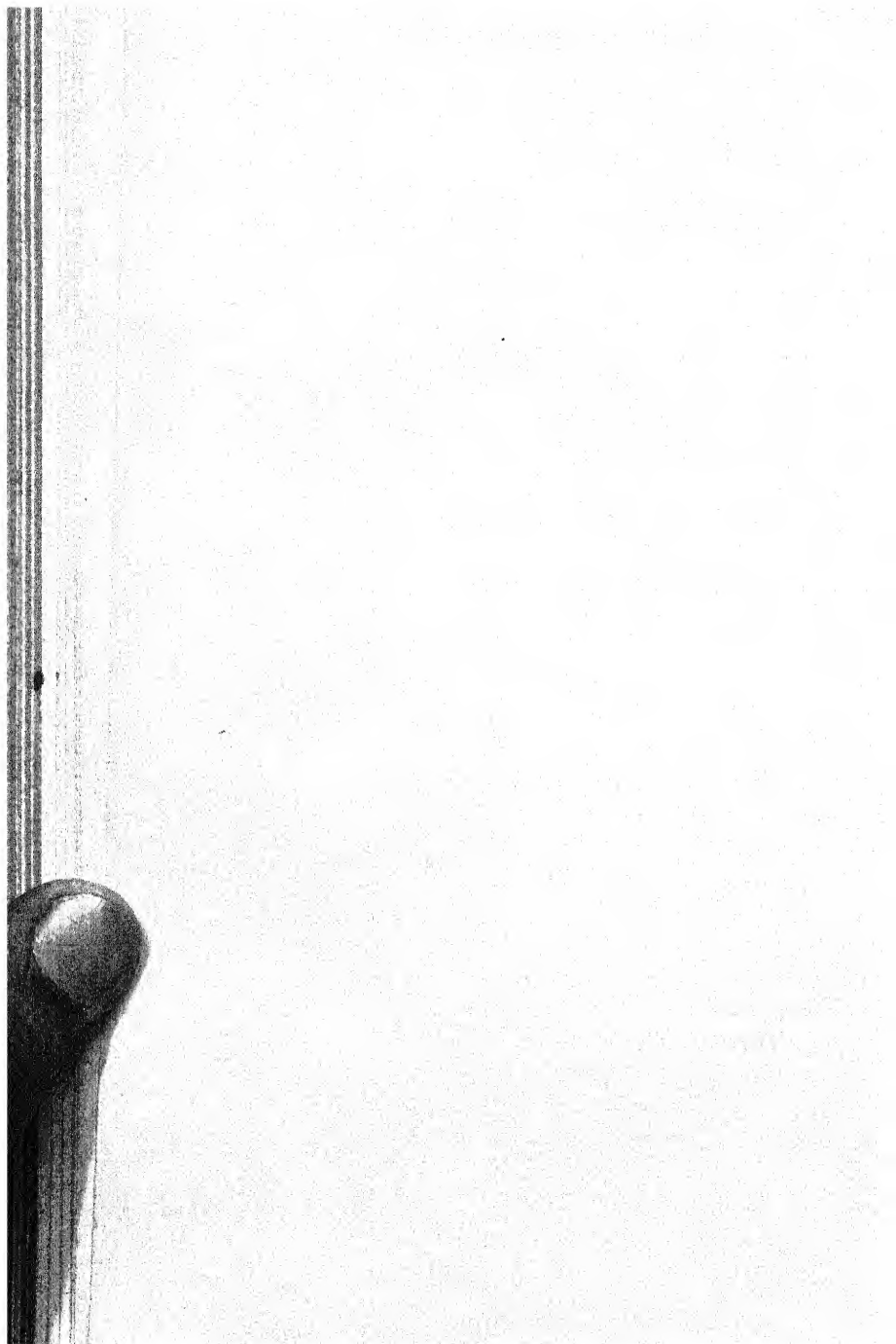
The annexed diagram is a section taken on the W. coast, between Honawer and Sedashegur.

The rarely fossiliferous character of this iron clay or ferruginous clay, as it has been called, which has puzzled some geologists, and inclined others to the theory of its volcanic origin, may be in some measure attributed to its highly ferriferous nature, often approaching that of an ore of iron. It is a fact, and, as Lyell observes, (*Geol.* Vol. II. p. 102,) one not yet accounted for, that scarcely any fossil remains are preserved in stratified rocks in which this oxide of iron (derived from the disintegration of hornblende or mica) abounds; and when we find fossils in the new or old red sandstone in England, it is in the grey and usually calcareous beds that they occur.

I have often observed, particularly in the W. Ghauts, and on the Malabar and Concan coasts, where the rains fall heaviest, that the granitic, hypogene and trappean rocks containing most iron, weather into ferruginous and coloured clays that sometimes, lithologically speaking, resemble laterite, and these when that rock is near, cause the appearance of their passing into it. I have also observed beds of considerable magnitude of an impure oxide of iron in gneiss and hornblende, sometimes cellular and pisiform (and from which much of the iron in laterite has doubtless been derived); but when we look up from the microscopic view afforded by these slowly weathering blocks of rock and beds of ore in situ,



*Section shewing denudation of
Laterite between Honawer and
Sedashighur. Captain Newbold*



and cast our eyes upon even the present extent of laterite over the surface of Southern India, the thickness of its beds (at Beder 200 feet,) its flat-topped ranges of hills, the great gaps effected in their continuity evidently by aqueous causes no longer in action, its often elevated position above the drainage of the country, its imbedding layers of lignite from silicified wood, and occasionally water-worn pebbles of distant rocks, we find we can no more attribute its origin to the weathering of rocks *in situ*, or to their present transported detritus, than that of the old sandstones of Europe to the sandy disintegration now in progress of accumulating by rains around the bases of older sandstone, granite, and hypogene rocks, although a mineral resemblance exists as in the case of the true and pseudo-laterites.

Having said thus much to warrant my placing laterite among the rocks of aqueous and mechanical origin, I shall proceed to notice it as it occurs in the South Mahratta country. It may be remarked, *passim*, that fossil shells have been scarcely ever found in the tertiary Rhenish brown coal beds, though in the vicinity of Bonn large blocks have been met with of a white opaque chert, containing numerous casts of fresh-water shells, which appear to belong to *Planorbis rotundatus* and *Limnea longiscata*.^{*} The laterite capping the overlying trap of the South Mahratta country does not appear to have been invaded or altered by it like the brown coal beds. But similar blocks of chert containing fresh-water shells, viz. two species of *Cypris*, three of *Unio*, and many individuals referable to the genera *Paludina*, *Physa* and *Limnea*, and also *Gyrogonites*, have been discovered by Mr. Malcolmson and myself entangled in it.

Near Kulladghi, where it reposes on the limestone, it exhibits undoubted signs of horizontal stratification. It is never seen altered by the granite or trap. West of Kulladghi, near Ooperhutti, beds of a gritty sandstone loosely agglutinated, resembling that into which the laterite passes near Beypoor on the Malabar Coast, rest in a similarly horizontal and unaltered position on the overlying trap; fragments of which occur in this superimposed sandstone.

Kunker, Gravel, and Regur. That singular deposit, for so I consider the Regur, is superimposed on all the rocks that I have just de-

^{*} Lyell, Elements, Vol. II, pp. 281-282.

scribed. There is frequently an intervening bed of gravel or of the older kunker, in which the remains of a mastodon have been discovered, near Hingoli, Nizam's country. I have not met with gravel beds in the South Mahratta country. The diamond is found in the gravel beds below the Regur in the Cuddapah district. My ideas regarding the origin of those deposits have been elsewhere stated.

Age of the Plutonic and Trappean Rocks.—Granite. From the rarity of sections, it is difficult to ascertain the relative age of the granite by the tests usually resorted to by geologists in fixing the ages of plutonic rock, viz.:

- 1st. Intrusion and alteration.
- 2nd. Included fragments.
- 3rd. Relative position.
- 4th. Mineral character.

Christie evidently views the granite of the South Mahratta country as primitive, according to the Wernerian theory; but states that there is a granite at Gairsuppa, in Canara, "not so old as the common granite of India," which, from mineral character and association with the gneiss and other hypogene rocks, he classes with them, in the transition series of this school. But within the last half century it has been ascertained that this granite, considered formerly as the oldest of rocks, sometimes belongs even to the tertiary period, and its presence at Gairsuppa, and in the southern portions of the South Mahratta country, intruding into, disturbing and altering as it does, these crystalline schists, plainly proves its posterior origin.

But there is no proof adduced of any other granite of India being anterior to the granite of Gairsuppa, and there is every reason to believe that the granite of Gairsuppa and the Western Ghauts must rank among the oldest granites of India, until the age of the rocks they have altered and intruded into be satisfactorily proved to be posterior to the other hypogene rocks that prevail so extensively over its surface.

There is, moreover, a granite more modern than the common granite of the Western Ghauts, Gairsuppa, and indeed of India, which is seen to penetrate the latter in veins and dykes, a fact proving its posterior origin,—and which, although it has not hitherto been discovered

in the state of dykes in the sandstone and limestone, has converted the former into quartz rock, and the shales of the latter into jasper and chert, indicating a posterior or contemporaneous origin.

The disturbance and metamorphic effects produced by the eruption of this granite do not appear to extend to any great distance from the foci of plutonic disturbance. The sandstone ranges in the S. Mahratta country are usually little inclined, particularly in the ranges S. of the Malpurba, resting unconformably on the hypogene schists and granite, in highly inclined stratification; but travelling a short distance north we find them showing more signs of plutonic disturbance, and, according to Christie, the sandstone of Chick Nurgoond is uplifted at an angle of 40° resting on the vertical hypogene schists; a fact indicating two eras of plutonic disturbance.

It is a striking fact that no fragments of undoubted granite or gneiss have been noticed in the pebbles of these sandstone conglomerates, which consist chiefly of quartz, chert, jasper, basalt, flinty slate, and the hard portions of the chloritic and actynolitic schists, the two last rocks bearing a small per centage in relation to the rest, and those of quartz greatly predominating in the lower beds. The inference is, either that the attrition which converted the wreck of the pre-existing rocks into sand and gravel was so great, as to grind down their mass beyond the possibility of recognition, leaving nothing but fragments of their hardest nodules and veins, or that the oldest granite was still undenuded, and with the gneiss at this era was as yet but partially uplifted and retained its natural subordinate position.

It is certain however from the included pebbles of the flinty slate, jasper, actynolited and chloritic schists, that the plutonic action of granite had commenced prior to the origin of the sandstone, and had metamorphosed or crystallized the hypogene, or rather formed schists of the wreck of which the sandstone is formed.

If this reasoning be admitted, it is obvious that at least two epochs of great plutonic activity have taken place. The first anterior to the formation of the limestone and sandstone, by which the hypogene schists were rendered crystalline and partially subverted. The second, posterior; and marked by another granitic eruption, which burst up through fissures in the old granite, altering the limestone and sand-

stone. From the latter occasionally resting on the former in less disturbed strata it may be inferred, that the limestone suffered some degree of dislocation before the sandstone was deposited. There is little doubt from the unaltered and highly inclined stratification of some of the beds resting on the granite, that it must have been protruded by this second upheaval in a solid form. Other highly inclined beds are altered, which indicates a heated but solid state of the intruding rocks.

The third movement or series of movements by which perhaps a great part of S. India was slowly and gently lifted up to its present elevation, raising beds of laterite in a horizontal position to the height of 7,000 feet and upwards, appears to have taken place during the tertiary period. This great *soulevement* is perhaps rather attributable to volcanic than plutonic action, since the granites of both eras appear to have been raised in a solid form, and no granite of India has yet been observed altering or intruding into tertiary rock. Possibly its phenomena were connected with those attending and following the grandest eruption of trap in the whole world, the overlying trap of Western and Central India, which evidently took place in the tertiary period.

During these epochs, it is almost needless to say, that the surface must have undergone various oscillations at different periods, during which the aqueous strata were deposited, consolidated, and partially denuded, uplifted and submerged.

Age of Basaltic greenstone. Like the granite the basaltic greenstone is evidently of two eruptive epochs, as we see dykes of it crossed by more recent dykes.

The greenstone of the first epoch is posterior to the older granite and hypogene rocks which it penetrates, and with which it has been uplifted in a solid form; partaking of all their dislocations and abrupt truncations. This older greenstone stops short of the sandstone; the conglomerates of the latter imbed pebbles of the greenstone.

The newer basaltic greenstone penetrates, and alters the limestone and sandstone, but stops short of the laterite. Both rocks are distinguished mineralogically from the tertiary or overlying traps by their rarely assuming an amygdaloidal character, and their freedom from agates, opals, calcedonies, zeolites, green earth, olivine, &c., so abundant in the latter.

Age of the overlying Trap. It overlies and penetrates the sandstone and newer basaltic greenstone, and from its altering and disturbing the fresh-water limestones of Nirmul, and its superior position to all the rocks of the S. Mahratta country except the laterite, kunker, and regur, is referred to the tertiary epoch. It is strikingly mineralogically distinguished from the older trap rocks, as just explained.

The order of superposition of the rocks of the S. Mahratta country in descending order appears to be as follows :—

Regur,	}	1st group.
Old kunker,		
Laterite,		
Lateritic sandstone,		
Overlying trap,		
Basaltic greenstone,	}	2nd group.
Granite,		
Sandstone,		
Basaltic greenstone,	}	3rd group.
Granite,		
Hypogene schists,		

Comparison of these groups with classified European groups. There can be little doubt of the rocks of the 1st group belonging to the tertiary period, after what has been remarked regarding the age of the overlying trap on which they are superimposed. The remains of the Mastodon have been found, with other fossils pointing to the Pleiocene division of the tertiary epoch, in the gravel and kunker below the regur, near Hingoli, in the Nizam's territories. No fossils have been yet found in the regur; but its position, extent, thickness, and the impossibility of accounting for it by causes now existing, warrant me perhaps in referring it to an epoch anterior to the post-Pleiocene or historic period.

2nd Group. No sufficient data for fixing exactly the age of these rocks. The presence of coal and other mineral and fossil indications point to the Devonian or carboniferous groups.

3rd Group. The clue to the approximate age of these rocks will be found in properly fixing those of the second; a point of great impor-

tance in the geology of India, and to which I would fain call the attention and endeavours of all geological observers to fix, by searching for fossils, &c. If the rocks of the second group belong to the Devonian series, the hypogene schists must be either the rocks of the Silurian or Cambrian series, as their unconformable stratification points out a greater age than the less disturbed and superimposed beds of limestone and sandstone. We need not even despair of finding fossils in gneiss, chlorite, and mica slates of India, since that illustrious geologist Elie de Beaumont displayed to the wondering eyes of the Savans of Europe the instructive fact of belemnites, (a fossil of the chalk period,) in chlorite schist.

An Account of the early Ghiljáees. By Major R. LEECH, C. B., late Political Agent, Torán Ghiljáees at Kálát-i-Ghiljáee. From the Political Secretariat of the Government of India.

[The character of part of this paper is somewhat of a lighter order than usually appears in our pages : but our readers will at once understand the motives which have led us most readily to avail ourselves of it, almost as written. The traditions of the Ghilzaees recorded by Major Leech, give a valuable insight into the manners and habits, the social condition and the ordinary train of thoughts, of a race of men very little known. The acute observation of the writer of the memoir has let no point escape him which may illustrate the real character of the curious tribe whom he describes ; and the student in ethnography will, we are convinced, be thankful for the exposition of social peculiarities thus afforded to him.—Eds.]

The following account has been compiled from notes taken partly when Political Agent at Candahar in 1839-40, and partly while in political superintendence of the expedition under Colonel Chambers against the Toran Ghiljaees in 1841, and while Political Agent at Kálát-i-Ghiljáee in 1841-42, (during the siege,) and partly from a written

account drawn up at my request by Mulla Pairo Lodeen, who staid with me throughout the siege.

The Ghiljaees, as will be shewn, are only Afghans by the mother's side, being by the father's descended from the Sultans of Ghor.

The word is properly Ghalzo'e: from *ghal*, thief; and *zo'e*, son—meaning the son of theft, the fruit of a clandestine amour. The Ghiljaees themselves give this derivation of the word, although they would appear to be ashamed of it by turning Ghalzo'e into Ghiljaee. The Persians have out of compliment turned it for them into Ghilzye.

On the 28th August 1841, while making a tour through the, till then, unvisited Ghiljaee tribes of the Arghandah valley, a Rokhee Mulla of some reputed sanctity and respect in the tribes, said they were all Ghiljaees, as the Persians pronounced the word Ghiljyes as the Afghans and themselves did, from being descended from Ghilj the son of king Bet.

In my journal kept during the siege, I find the following memorandum, dated 22nd April 1842.

"May not the word Ghilzye be derived from غلبچ Ghalech. (The Persian vowel mark *zer* having in Afghanee the pronunciation of *a* in hare); and Ghalech being often written for قلابچ Kilech: and the tribe may have been called Ghalechees, or descendants of Ghalech. An acquaintance, a great grandson of Ashraf-khan, is named Ghalech-khan."

A mistake has very generally been committed by supposing the termination *zye* or *zai* to the names of Afghan tribes to be derived from the Persian word for to be born. The word is a corruption of the Pushtoo *zo'e* a son, and a true Afghan of the *sarah* or country would tell you he was a Popalzo'e or Babakanzo'e as the case might be; a Popalite or Babakanite; and he would not say he was a Popalzye or Babakanzye, on pain of being abused as a spai zaman (*comes filius*) Parseeban.

It is related that the Caliph Abdul Malik, son of Marwan, despatched his commander-in-chief Hujaj, son of Yoosaf, a Sakufee by tribe, to subdue Ghoristan. It was then under two princes, Shah Jalaladeen and Shah Muazzadeen, sons of Sultan Bahram who had the country given him in grant by Alee, the cousin of Mahammad, on a visit he paid

the Hazrat at Medina. The great grandfather of Sultan Bahram was Soosee, alias Mahammad Sam Ghoree, who first introduced Islamism into Hindustan. It was he that built the fort of Sealkot, and that killed Raja Pathoorā.

The Sultans of Ghor were descended from Zohauk, nephew of Ibas, son of Esam, son of Sam, son of Noah, who expelled Jamsheed from Persia.

Shah Husein, the son of Shah Muazzadeen, emigrated on the invasion to the country of Shaikh Batanee, between Cabool and Candahar, by whom he was received into his family. Batanee had a daughter, with whom the tradition runs; Shaikh Husein formed a connection, unknown to the parents, until their daughter's appearance betrayed her.

The Ghiljaees still preserve this time-honored custom, judging from several cases that came under my notice, the most prominent of which occurred at Kalat-i-Ghilzye. A young unmarried lady of the aristocratic Shah Alam Khel branch of Rokhee Ghiljaee, was safely delivered of a son and heir, the father of which, her intended, was no less than a holy Sayad of Pishing, then absent in India. It appears that they were engaged, and at liberty therefore to have their Namzat-bazee; but as the Sayad had not paid up the whole of the marriage settlement by some 100 rupees, the parents would not allow him to take her home. He therefore resorted to this Ghiljaee mode of cheapening his bargain. I met him afterwards in India, but did not enquire whether his lady was yet with her parents or with his own.

It is very probable that the Afghans, if they were really Israelites, should have been posted by their Cabtu Bukhtanasar on the confines of his dominions towards India. We find Sultan Shahabudeen bringing down the Afghans from Ghor and posting them on the borders of India, and this system of colonizing an unquiet border with convicts seems to have been much in vogue. Thus we find the tribe of Hazarāhs far from their present country, posted in the plains of the Punjab below Cashmeer. A colony of Persians was planted in Cabool, and one of Ghiljaees in Balkh. And between the Ghiljaees and Duraneees on the Candahar road, we find ten solitary houses of Hazarāhs, so called by the Afghans, at Asya Hazarah; no doubt a larger colony was once posted there to keep the peace between those two rival tribes.

I find from my journal, that on the 28th September 1844, I sent for their chief men to gain information. They informed me they were originally Uzbecks from Turkistan, and are by tribe Sadlechees. They have the water of the canal called Bokanah. They furnished six men and one officer to the Duranees, and were enrolled among the Baneezais.

But to return to the lovers. On Shaikh Batanee and his wife discovering the state of their daughter's affections and person, they became most anxious to have the couple married; but family pride was in the way, and they were anxious first to know concerning the *syal* or rank in society of their guest. He was therefore questioned, and gave himself out as a prince born, and invited them to ascertain the fact by despatching some one to Ghor, his native country. This was done, and a confirmation of Husein's affirmation attained in time, it is to be hoped, to allow the babe to enter without shame into the world. Husein is said also to have married the messenger's daughter, in consideration of his taking the trouble of going all the way to Ghor; others say, that on his return he refused to confirm Husein's assertion until he had promised to marry his daughter also. This is probable, and according to the character of an Afghan Cossid, getting a promise made before imparting good news.

* * * * *

The Ghiljaees say, that Sultan Mahmood of Ghuznee first brought them down from the Koki-kase or Koki-roh, and they began to dig Karez, (vide the Karez of the Sulemanees near Ghuznee). Malcolm (I think) says they were nearly exterminated by that monarch, as a punishment for a party of them having plundered his baggage, and that they only regained strength in the time of Timoor.

The first person of note known to the present inhabitants was Sultan Malakhe, a Tokhee.

It is probable that Mahammad the progenitor of the Mahammad-zye Tokhees, and Isaac the progenitor of the Isak-zye Hotakees were both

* Note.—We have to apologise for omitting a brief, and apparently carefully compiled list of the genealogies of the Ghilzye families. It would be of interest were circumstances such as to place any of our readers in immediate communication with this tribe; but, as it is, we may be perhaps excused omitting it.—EDS.

men of note in their day, from these tribes being considered the aristocratic ones.

I saw a Rakam of Aurangzeb, dated the 9th of Jamadee'l-awal, 1022 A. H., appointing Malik Malakhe to the charge of the high road from Kalat to Karatoo, (the former is in the Tamak valley, and the latter in the Arghandah,) to protect it from Hazarah robbers. Aurangzeb no doubt found Malakhe the most powerful of the Ghilzye chiefs at enmity with the Hazarahs; as patronizing an officer of his own creation at court, he no doubt found very different from supporting a newly created chief over his tribe.

The Hotakees I suppose from being removed from the high road were not required by Aurangzeb, and therefore remained unnoticed; that monarch's sole object being to secure his communication with Ghuznee, Cabool and Hindustan, and not coveting revenue from their Karazees, and almond orchards.

The Hazarahs are said to have been driven out of the Arghandah valley in four days.* Malakhe is said on this short campaign to have received valuable co-operation from the Khan-khel chief Mane, whose descendant I find from my journal visited me on the 13th August 1841.

Khuram says he is the son of Taj Mahammad, the son of Avqhan, the son of Khajah, the son of Mane, the son of Taoos, the son of Daroo, the son of Habeeb, the son of Khan, the son of Parwat, the son of Barak by his wife Khatah, the son of Mahammad, the son of Yoonus, the son of Rahmand, the son of Tokh, the son of Baroo, the son of Tolad, the son of Ghiljye. I have mentioned the descendants of Malakhe in a former part of this account.

At the time that Malakhe was chief of the whole Toran tribe, (both Hotakees and Tokhees,) Jabbar it is said was chief of the Ibrahim Ghiljyes.

The Peer-khanah, or spiritual fatherhood of Malakhe were the So-deen (Ala-udeen properly) Sayads.

Malakhe had a daughter, by name Nazo; who was one day playing below Kalat-i-Ghiljye with girls of her own age, on the banks of the

* This might have been effected by Aurangzeb's troops, had they known of the existence of the Passes discovered by me in 1841. That from Kalat-i-Ghiljaee to Surkh Sang (No. 1, Appendix,) and the other from Chasmah-i-Moosaka, via Cheeno into Karatoo, (No. 3, Appendix.)

river Tarnak, when a Fakeer, appearing to be from Hindustan, approached the party, and said, "What good girl among you will give me a kiss?" Some ran away, others hid their faces, and some abused him; but Nazo, throwing back her veil, and approaching, said, "Oh Fakeer, a kiss of my face is at your service."

The Fakeer, to the surprise of all, instead of availing himself of the offer, stroked her head with a fatherly hand, and said, "I have prayed to God to give you three or four children; one of whom shall be a king, (Hajee Meer-khan, alias Meer Wais)."

The father of Meer Wais (a Sodeen is the informant,) was in the employ of Malakhe, whose daughter Nazo falling in love with him, (true daughter of Ghalzo'e,) an elopement to the Ataghar hills, occupied by the Hotaks, was the result; who, however, for fear of Malakhe's wrath, refused them refuge; and they had to spend their honey-moon in the desert hills, living principally on game.

Getting tired of this, Nazo proposed to her husband that they should go "Nanawat" (as supplicants) to her father, who was of a forgiving disposition.

Having no other resource this plan was adopted, and with success. Malakhe received them kindly, as well as some Hotaks who accompanied them. When giving them leave, Malakhe asked his daughter what she would have, a chadar or veil; it being the Afghan custom that the first time a daughter visits her father after her marriage, he gives her a veil. She replied, "The Hotaks have no land (on the Tarnak river), kindly give me a piece of land."

Malakhe gave her a piece of land below the Tabaksar hill, opposite to Kalat, watered by and dependent on the Ajurghak canal; and to the groom who led the horse she rode, he gave the land dependent on the spring of the Jukhtaran hill close by. This Jillodar was a Kishyanee by tribe. Others say, that Nazo got ten days and nights water right on the canal, and her groom two. These shares are now (1841) distinct.

Malakhe was killed in battle at Darwazye, between Inzargai and Surkh Sang, and was buried at Ab-i-Yazee.

The father of Meer Wais is called by the Hotaks Shah Alam. The Tokhees contradict them, and say they only were called Shah Alam-khels after their progenitor married a Shah Alam Tokhee's daughter.

This is absurd; for by the Tokhee's own shewing, Shah Alam was the son of Alee Malakhe's brother, so that Nazo was not a Shah Alam-khel.

Jabbar, the Ibrahim chief, was killed at Yayas [in battle with the Safees, and buried on the road between Cabool and Jalalabad. The place where his tomb is situated is famous for cold, wolves, and thieves, on which account some Persian traveller has cursed the tomb. In the course of time, Nazo gave birth to Hajee Meer-khan, alias Meer Wais, the same who liberated his country from the Persian rule, and his countrymen from the tyranny of Shahnawaz-khan, the Georgian governor of Candahar.

The reasons for Meer Wais visiting Persia are found in Malcolm's Persia, and more in detail in the *Chronicles of a Traveller*. The Ghiljyes believe that while at Mecca he demanded a sign from heaven, that he should free his country from a foreign yoke. It was given him. On awaking, his sword was found lying bare at some distance from the scabbard in which he had secured it before going to sleep.

It was Shahnawaz's penchant for wine and women, that lost the country for the Persians be it remembered, and he was a Faringee.

Beyond the village of Chahil Dukhtaran on the road to Chahil Zeena, there is a slippery rock called Ang-i-Sakhshak, down which the children of Candahar on Fridays and other holidays slide. This was one of the scenes of Shahnawaz's debaucheries.

The place at which he met his well-merited death was at Bela-i-Sultan Khudadad in Argasthan—he was following or despatching 300 horse across the Band-i-gil,* on the road to Maroof, to collect revenue from the Kakers. He was not thought worthy to be killed by the hand of a man; so Murado, a Babee eunuch and jester, was ordered to kill him in full durbar the day after his seizure. The following Pushtoo Badala is still extant:

“Sháhnawáza bujul báza,
Da Murado da lás parotiya kuna wáza.”

* I find from a memorandum in my journal in November 1839, that the road from Candahar to Deh-i-Ambar was occupied by Popalzais, and that I proposed to make the following arrangements for the protection of the road beyond Deh-i-Ambar, viz:—On the Candahar side of the Tagak Pass near some wells, a small fort to be built and eight horsemen to be stationed; on the other side of the Tagak Pass, at a place called Hou-

Shahnawaz the bujul-baz, (player with the knuckles of legs of mutton, *i. e.* a light fellow of low habits.)

By the hand of Murado (there) you lie exposed.

Shah Ashraf was, the Ghiljaees say, killed by his cousin Shah Husen of Candahar, (*i. e.* by his orders,) on his arrival at Koh-i-Mundak. Some deny that Ashraf murdered Mahmood, believing that he died mad.

The wars of Mahmood, and his cousin and successor Ashraf in Persia, are detailed in the Chronicles of a Traveller. The following two anecdotes are still told strangers visiting Candahar, connected with the invasions of Persia: one is, that many of the Ghiljaees who accompanied Mahmood on his expedition to Persia were mounted on bullocks, with their ragged kosaks or felt cloaks on, and their sheep's skin of flour strapped to their backs, and an old iron hatchet or a sword in a broken scabbard their only arms, just as if they were going to the water-mill at the bottom of their native village to bring home flour. This will be easily believed by officers who have been in Afghanistan, and have seen after an engagement bodies of men with nothing but sticks in their hands. When the city of Ispahan was taken, it is said that Shah Mahmood gave his followers leave to take possession of the house that each might enter, with every thing in it, even the widow of its owner who fell fighting, for his home. That one of the handsomest palaces of Ispahan thus fell to the lot of such a "Ghool-i-Biyaban" as I have above described; who entered it in his above full dress, leading his bullock after him into a splendid saloon covered with rich carpets, at the end of which was seated the lady of the mansion surrounded by her damsels; and backwards and forwards over the carpets these two animals walked, the one looking for some thing to which he could tie his fellow.

The lady of the mansion ordered her handmaids to do all they could to please the visitor; to take his bullock into the stable, and divest him of his boots of sandals and tattered woollen cloak, and take him to the bath.

This they had some difficulty in doing, as he would not consent at first that his bullock, sandals or cloak should be taken out of his sight, they being his only ones; and each article was surrendered after a little dakai, a fort and six horsemen; on the Candahar side of the Gill Pass at a water-mill, a fort and eight horsemen; on the other side of ditto, six horsemen; at Jaknaree and Shamai, a fort and eight horsemen. The whole under Abdul Lateef-khan, Barikzai, of Maroof.

struggle, accompanied with Pushtoo abuse ; the handmaids setting his mind at ease in Persian, of which he did not understand a word, and by signs. He was finally taken to the bath, and never had the attendant barbers operated on such a subject before, the cracks in his huge feet and hands being like ravines of his native hills. After cleansing him as much as possible, and shaving his hedge hog-looking head of hair, he was attired in trousers and shirt of red twilled cotton, the richest under garments a *man* must wear, and other suitable parts of dress ; and conducted back into the saloon, where a rich entertainment was laid out, at which the lady of the mansion presided.

The Afghan finding himself more at home, determined to make the most of his good fortune, and act the part of the master of the house.

Observing that the trousers of the lady were of gold stuff, while his were of common red, he insisted on an exchange ; and in them went he next morning, proud of his appearance, to Mahmood's *darbar*, where his appearance putting his illustrious tribesmen to shame, he got nothing but a sound beating.

The second anecdote was told me on the scene of its occurrence, the Achakzai hills, on the 23rd May 1838, while ascending the Kojak Pass. An Achakzai who had accompanied Shah Mahmood on his expedition to Persia, had married a rich lady of Ispahan. In the midst of the rich repasts she provided for him, and the beautiful garden of a hundred fountains and thousand parterres that he found himself master of, he would sigh (between a grunt, a groan and a growl,) " Oh ! for my country of the thousand-holed cakes, and alas ! for its Makhai gardens."

The lady, fancying rightly that the country that could surpass the capital of Persia in its luxuries, must be heaven itself, determined to return with her new husband to Afghanistan. Whatever might have been her misgivings on the road, seeing that as they advanced the fertility of the country decreased, her despair was at its height on arriving at *home*—a *khel* or encampment of *ghijdee*, (black hair tent) in one of the wildest parts of the Achakzai hills. But her heart broke when she found that the thousand-holed bread was made of the vetch called *gál*, which becomes honey-combed in baking (food that her slaves would reject in Persia,) and that the Makhai gardens were nothing

but the stony hills covered with the thorn, known by that name in Pushtoo.

It was such uncivilized acts as the above, no doubt, that made the Persians stigmatize the Afghans with the following :

Oughán i khar, Tobra ba sar;
Bákalee ba khar, Dingla ba zan :

Which the Afghans retort in the clumsy "Tuguogue" of Parseeban,

Da khira kurbán.

Leaving the period of the Ghiljye (not Afghan) wars in Persia to the above-mentioned authorities, I return to the seat of the tribes.

On Hajee Meer-khan (who seems to have set the fashion of performing the Haj to Mecca, as we find many Hajees among the chiefs both Afghans and Ghiljyes about his time,) gaining possession of Candahar, he called on the Tokhees to pay him revenue for their lands, and furnish him with recruits for his wars, as they had not assisted him in the late struggle. In reply, they asked how they could be expected to give up rights that they had acquired with so much trouble, and after so many battles.

The chiefs of the Tokhees at this time were Shah Alam, the son of Alee, the brother of Malakhe, and the son of Shah Alam, Khushal-khan, and they would not acknowledge the supremacy of the Hotakees ; war therefore broke out between the tribes, and the Tokhees were obliged at last to quit the Tarnak valley and take refuge, that is, to retire to the Arghandah.* Others formed into two Toraks or gatherings. The Shah Husen-khel, and other tribes about Ab-i-Tazee had their gathering at Yakhav, and the Peerak-khels and other tribes around them had their gathering at Omakai-kalat, at this time was held by the Tokhees under Hajee Edil, the son of Malakhe, to whom are attributed some supernatural powers.

He had a son called Bayai, a very brave and daring man ; who built a small fort on the river Tarnak, a little way from Kalat up the road ; and the Hotakees had a fort on the other side of the river at Jukhtaran, the Hotak gathering being at Choudai.

* I found in 1841, that a threat to burn the crops they had left standing, and to fill in their karez (irrigation tunnels,) brought them back to the Tarnak, (month of July.)

Although Bayai had 100 men in his fort, he always went out alone on his expeditions, which were directed against the opposite Hotak fort. It was his habit at dawn to attack the people of the fort as soon as they came out, and he sometimes brought three and four heads, and no one dared to meet him hand to hand; at last the drinking-water of the Hotaks became bitter, (i. e. they were hard prest) and they laid in ambush for him one morning; and, hamstringing his horse first, succeeded in killing him. On the death of Bayai, Kalat was taken possession of by the Hotaks, and now Mahammad-khan, alias Hajee Angoo, the son of Yaya, and nephew of Meer Wais, became governor.

About this time the report of Nadir Shah's marching on Candahar reached the country, and the Hotakees assembled and came to the decision that they had a new and powerful enemy in front, (Nadir Shah) and an old one in their rear (the Tokhees,) and that it was prudent to get rid of the enemy in the rear, and then meet the enemy in front; therefore they collected their whole tribe, besides procuring 4,000 horse from Candahar and from Puli Sangee, made a sudden attack on the Peerak-khel Tarakut Umakai, which might be said to be empty, as the chiefs Ashraf-khan and Allaiyar-khan, sons of Khushal, were absent on the Arghandah to collect troops. The whole Torak was massacred, women with child not being spared. On Ashraf-khan and Allaiyar-khan hearing of this disaster, they took the most solemn oath an Afghan can, viz., *Zan-talak*, that they would not spend a night at home before they had revenged themselves on the Hotakees. *Zan-talak* is divorcement of a wife.

Proceeding via Mezan and Teereen, they joined Nadir Shah's camp at Cheenaran, and tendered their allegiance. That monarch appointed Allaiyar-khan his deputy at Ispahan, and was led by Ashraf-khan to Candahar, (Herat being taken after a siege,) which place it is said held out for fourteen months. The heroic defence of the burj or tower of Mulla Alea, a Ghiljye, after the fall of Candahar, deserves to be recorded. The ruins of it are incredibly small in extent.

When Nadir was besieging Candahar, Abdul Ghafoor was governor of Kalat-i-Ghiljye; he with Abdul Rasool, were sons of Hajee Angoo, by a Peerak-khel Tokhee mother. Abdul Rasool had gone to Sarobai of the Kharotees, to collect the Ghiljyes of that neighbourhood to raise the siege of Candahar. Nadir heard of it, and made a Chapao on the levies at

Shibar, of whom he made a great slaughter. Here Jan Tarakee came in; Nadir then returned to Candahar, leaving 4,000 men to besiege Kalat; when it fell, Jan Tarakee was left in command.

Moosa-khan, father of Maddut-khan Isakzai Duranee, (surnamed Dongee) conducted the Chapao on Shibar. The grave of Jan Tarakee is on the top of Kalat, over the spring close to that of the Fakeer. He had such power over the tribe as to have left the proverb behind him of

“Wak da Khudá dai da Ján Tarakee.”

“It rests with (or depends on) God;” and Jan Tarakee, one of the present Tarakee chiefs, Arzhegee, (1st July 1841,) is the son of Ala Verdee, the son of Suleman, the son of Jan, the son of Meer-khan, the son of Kasam, the son of Doulat, the son of Madoo, the son of Peroz, the son of Nassoo, the son of Mummye, the son of Ahmed, the son of Tarak.

Nadir Shah conferred on Ashraf-khan the chiefship of all the Ghurghushtees, and avenged him on the Hotaks by leading away captive 1,500 of their families to Hindustan, Turkistan and Persia.

During the first part of the reign of Ahmed Shah, Ashraf-khan was governor of both Kalat and Ghuznee, and he accompanied the Shah on his first campaign to Hindustan. On his return the Duranee chiefs persuaded the Shah, that Ashraf-khan was far too powerful for a subject. He with his son Haleem-khan were therefore invited to Candahar and thrown into prison, and their seals were made use of to entice Allaiyar from Ispahan, the Shah proposing to share his conquests with him.

Allaiyar-khan on his arrival was also thrown into prison, and nothing is known how these three met their fate; the wall of their prison by some is said to have fallen on them.

Although the above belongs to the history of Ahmed Shah, I mention it, as of course his historian would neglect to do so.

I met in the Ghiljye country, which I had failed to do at Candahar, traces of Zamroot Shah of Candahar, on the 23rd August 1841. At Dab-i-Pighai, not far from the shrine of Taroo Nika, on the brink of the hill, the remains of a small fort are pointed out. Here it is said that Zamroot Shah banished a mistress, by name Lolee, to employ herself in agriculture and gardening, and that in her ignorance she planted parched wheat. A more beautiful view than from this position on a fine

day cannot be imagined. Near the above-mentioned shrine is a spring, which it is said cannot be fathomed. Its water is efficaciously used in cases of Sujah-Sulfa (black cough) in children, which either lasts two months or forty days, from which no child is exempt.

I have mentioned before, that the Khaleels and Momands held the country before the Hazarabs. I remember one day on the Arghandah asking a Tokhee chief, what a stone and mud pillar on a neighbouring eminence was for? It was built, said he, long before our time; it is some boundary mark of the Khaleels and Momands. In my journal under date 22nd January 1842, I find the following memorandum:

Shekh Mate-khaleel had (the Khalak people say) four sons and one daughter; Shah-i-Mardan, Kalat, Garmam, Hasan, and a daughter Jukhtaran, who all on being buried sent forth springs of water from their respective graves of the same quality, which retains its temperature during winter, (it may then be seen running smoking down the hill.) The graves are all in the neighbourhood;—Jukhtaran, a small mound east of Kalat, just across the Tarnak Hasan-i-Mate, above the village of Khalak; Garmam, (they deny the word being Garmah) west of Kalat; and Shah-i-Mardan, south of Kalat, a small flat-topped hill like the one over Khalak called Tabaksar. They say that Shah-i-Mardan outlived his brothers and sister, and boasted that as they had made streams of water, he on his death would make a river. On account of this vanity and presumption, the stream from his grave is the smallest of all, only supplying drinking water.

In Dara's translation of Nyamatullah's history of the Afghans, Part II, page 19, Chapter XX., Shekh Mati-khaleel is mentioned as chief of twelve Sarbanni clans. Hasan-i-Mate lived, we may suppose, in the time of Zeerak, the great grandson of Abdul, and in the time of Nahmand the great grandson of Ghiljye, and the fort of Kalat was of course never fortified before the spring on the top of the hill burst out; and it may be assumed, that it was first fortified by some royal hand, as the surrounding tribes would never have allowed one branch to occupy such a commanding position.

I never succeeded in satisfactorily ascertaining whether Shah-i-Safa or Kalat was the oldest. The former is said to have got its name from some sick monarch, who then experienced "Shafa" (recovery) from his disease. I have heard it called by some the capital of the country once

called Bakhtar; and by others, that of Zameen-i-Khawar, who is said to have been a brother of Dawar, (Zamundawar). I have no doubt Aurangzeb fortified Kalat-i-Ghilje for Sultan Malakhe, and Shah-i-Safa for Sultan Khudakye, if he found them dilapidated. Sher-khan, we find from the account of the early Abdalees, brother of Sultan Khudakye, commanded at Shah-i-Safa on the part of the king of Delhi.

I had almost forgot to mention, that the Moosa-khel Tokhees are divided into Buran-khels, Nazar-khels and Khwaidad-khels; and that the latter are divided into Shakee-khels and Mamee-khels.

Although the account of the early Ghilzyes ought to end here, I cannot forego giving an abstract translation of Mulla Pairo's whole account.

Mahammad Ameen-khan, the son of Ashruf, and Rahmatullah-khan the son of Allaiyar, on hearing of the fate of their fathers fled to the Suleman-khel country to Zarmut and Kalawaz. Azam-khan, the son of Ashruf, and some other children were led captive from Kalat to Zameen-dawar. From this place effecting their escape, they fled to the Persian court, and from it received the countries of Khukees and Nermasher. Ahmed Shah conferred the chiefship of the Tokhees and Kalat on Soorkai-khan Babakarzai, who was shortly after murdered by the Mahammad-zai Takhees.

Soorkai-khan had two sons, Sayud Rahmat-khan and Lashkaree-khan; the former accompanied the Shah on his campaigns, and the latter was stationed at Kalat.

On the 26th August 1841, I saw a descendant of his, Khaleel-khan, son of Rahmat, son of Hajee Munsoor, son of Usman Ghanee, (called Surkai Sultan by Nadir, and Khoja-khan by Ahmed Shah), son of Joga, son of Meer Hazar, son of Taooz, son of Kasum, son of Utman, son of Suleman, son of Babakar, son of Shamal, son of Yoonus, son of Rahmand, son of Tokh, son of Baroo, son of Tolad, son of Ghilje.

Sometime after the accession of Timoor Shah, Mahammad Ameer-khan was invited from the Suleman-khel by that monarch, and made chief of Kalat and of the Tokhees and Hazarabs; and on Timoor Shah marching from Candahar to Cabool, Mahammad Ameen (Amo) Khan paid his respects with 100 Suleman-khel swars at Pali Sangee, and received a dress of honor, and other marks of the royal favor: at the same

time Noorulla-khan, son of Hajee Angoo, was created chief of the Hota-kees, with the flattering title of Ikhlas Kulee-khan, and the revenue of the countries of Dera Ismail-khan, Daman, Banoo and Urgoon. He was on his death succeeded by his son, Abdu Raheem-khan.

On Azad-khan declaring independence in Cashmeer, Amo-khan was at Herat, from which place the Shah sent for him and despatched him with Sardar Maddut-khan Duranee at the head of a force to that province. In the battle that was fought with Azad-khan, Amo-khan was shot by some one of his own party at the back of the head, the ball coming out at one of his eyes: his corps was brought to Kalat to be buried. He left three sons, Nealee Nyamat-khan, Futteh-khan and Meer Alam-khan.

On the accession of Zaman Shah, Walee Mahammad-khan (with the title of Walee Nyamat-khan) succeeded his father, being very young, and Moladad-khan Moosa-khel was his naib, or deputy.

On Shahabudeen-khan, the son of Ramatullah-khan, coming into notice, a feud broke out in the tribe of Tokhees. The rise of Shahabudeen is thus accounted for. The Ameen-ul-mulk was by tribe a Babee, and having once in darbar spoken rather sharply to Walee Nyamat-khan, the latter foolishly allowed himself to retort with an old Pushtoo proverb. From that day Shahabudeen was taken by the hand, the Ameen-ul-mulk supplying him from his own private funds. The tribe arranged themselves in two parties, and Kalat was sometimes in the possession of one, and sometimes in that of the other. In one of the many skirmishes that took place, Moladad-khan, the Tokhee deputy was killed.

On one occasion some horses of Shah Zaman's coming with a caravan from Cabool, were plundered by some Tokhee robbers of the clan of Koortah-khel. Immediately on hearing of it, Walee Nyamat-khan with a few of his Yassawals pursued them. The robbers took to the hills, and Walee Nyamat-khan was killed by them while storming them. His corpse was conveyed to Kalat, and buried with his father's.

Fatteh-khan soon after avenged his brother's death, by decapitating several of the robbers, and making the rest take refuge in India; he hung up the heads below Kalat.

Shahabudeen-khan and Fatteh-khan were engaged in their quarrels until the war between the Ghilzyes and Duranees broke out, which occurred in the following manner.

Shah Mahmood from Candahar had made one march beyond Kalat, and Shah Zaman from Cabool had arrived at Aghojan; his chief Sardar Ahmed-khan Noorzye being with the advanced guard one stage ahead, (at Tazu) his defection from which place to Mahmood Shah caused the overthrow of Zaman Shah's power.

This *pad-shah gardush*, or revolution among the Duranees, occurring in the heart of the Ghilzye country, suggested to that tribe the present as a favourable opportunity to declare their independence, and make an attempt to establish a Ghilzye kingdom.

Abdu Raheem-khan Hotakee was declared king, and Shahabudeen his Vazeer; his hearty co-operation being secured by the former giving him his daughter Sahab Jan, (with whom when in her father's house he had been in love,) the wife of the defeated Shah Zaman, and mother of the princes Nasar, Kaisar and Mansoor, with all her jewels, and handsome carpets, and numerous cooking utensils. Shahabudeen-khan was left to stop communication on the high roads, and Abdu Raheem-khan went towards Cabool to raise the Suleman-khel. Troops were detached from Cabool, and the Ghilzyes were defeated; the Ibrahim Ghilzyes losing 5 or 6,000 men. Abdu Raheem-khan retired on Kalat; and a Duranee force having marched from Candahar, the Ghilzyes left their strong position on the hill to meet them, (Fatteh-khan had already gone over to the Duranees). The battle was fought between Jaldak and Umakai on the ridge called in Persian "Tappah-i-Surkh," and in Pushtoo "Sirah Ghah." The Ghilzyes were defeated; the Tokhees losing 7 or 800 men. The Hotakees being chiefly horsemen, escaped comparatively unscathed. Winter put an end to further hostilities. This year 1802 A. D., is still remembered by the Ghilzyes as the Sal-i-Katul, or year of massacre. The chiefs on the Ghiljye side were Abdu Raheem-khan Hotakee and Shahabudeen-khan Tokhee; those on the Duranee side were Abdul Majud-khan Barik-zai, Saidal-khan Alako-zai, Azam-khan Popal-zai, Shadee-khan Achak-zai, (Arzbegee) and Samandar-khan Bame-zai.

In the ensuing spring Ahmed-khan Noorzye marched with a force from Cabool. On his arrival at Hulan Rabak, the Jalal-zai Tokhees under Mulla Zafran, a grandson of Malakhi, opposed him; but were defeated with a loss of 600 men. Ahmed-khan continued his march to Candahar, and brought out a large Duranee force with guns and shaheens. This time the Tokhees under Shahabudeen-khan and Fatteh-khan, kept to

the hill of Kalat, out of which very strong position every attempt of the Duranees to dislodge them failed, with loss of men.

The Duranees failing at Kalat, determined to carry away the Ghiljye families which had been left for security on the Arghandah; and they boasted of this intention, calling to the Ghiljyes on the hill to ask Dara-khan if he had any message to send by them to his women and children. After the Duranees had started for the Arghandah, Dara-khan taking his swars by a short road arrived at the Tarak or encampment, in time enough, during the night to throw up a sangar or entrenchment of loose stones.

The Duranee detachment arrived in the morning, and were thrice repulsed from the sangar; but being disciplined troops, they were not easily to be defeated. At this time some of the occupants of the sangar who were not fighting for their honor (wives,) left the sangar and fled. The Duranees under cover of their laden ponies and mules, made another attack, which proved successful, and eight members of one family were cut down on the one carpet on which they were sitting. The Duranees lost 100 men.

This was the last battle between the Duranees, Tokhees and Hota-kees. After this Abdu Raheem-khan and Shahabudeen-khan retired to the Mammye hills. Shahzadah Shuja-ul-Mulk had also taken refuge in the Kaker country, where he organized a powerful faction, which Shahabudeen-khan and Fatteh-khan Babakar-zai joined, as did Shakarulla-khan, the son of Abdu Raheem-khan Hotakee. On Shuja-ul-Mulk becoming Shah, Fatteh-khan and Shakarulla-khan attended on him; but Shahabudeen-khan never did as long as he lived, for which the Shah never forgave him; and hearing of his having built a fort in Nawak, Gulistan-khan Achak-zai, governor of Peshawar, was despatched to destroy it; Fatteh-khan Babakar-zai accompanying him. On entering the district of Nawak, so secure was the Achak-zai chief that Shahabudeen-khan would shut himself up in his fort, that he accepted Fatteh-khan's invitation to dinner at his place, Jameeyat.

Shahabudeen-khan getting intelligence of this, sallied out with his cavalry and fell upon the Duranees as they were carelessly straggling on to their stage, and routed the cavalry, killed the artillery men, burnt the gun carriages, and spiked the guns, which remained there all the winter. Next spring Sohbat-khan Popal-zai, being detached from Cabool

with a force, recovered and mounted the guns, and made use of them for several days without effect against the fort walls, which remained entire until destroyed by British Sappers in the autumn of 1839.

Shahabudeen-khan and Fattah-khan for a long time were played off against each other by the tribe, and the enmity existing between them was considerably increased by Shahabudeen-khan's brother Meer Mahammad (whose praises as a bold soldier are still sung,) being killed by Fattah-khan, in the district of Khakah. This enmity continued unabated until the death of Fattah-khan, and the two rival chiefs had generally two or three fights every season, (harvest.) On the death of Fattah-khan, Shahabudeen-khan made the usual mourning visit to his son, (the present) Samad-khan, and this long-standing quarrel was then made up.

Samad-khan married a daughter of his, giving a daughter in return to his grandson, Mansoor-khan.

This brings the Toran Ghiljye history down to a tolerable modern period, and nothing remains to be noticed, but a few particulars regarding the forces furnished to the Duranee kings by the Ghiljyes.

The Andadees furnished 600 horse as did the Tarakees in the following proportion.

Babadeen-khels 120, Sak-khels 120, Peroz-khels 60, Tsoil-khels 60, Gurbuz-khels 120, and Na-khels 120.

The Hotakees furnished 500 as did the Shamal-zais, including the Babakar-zais 500, and the Tokhees furnished 1,000.

The Tokhees received 1,60,000 Tabreeze rupees (10 annas each) per annum thus :—

1064 Swars at 100,	..	..	..	..	1,06,400
Mausabdars, (officers,)	..	..	..	..	35,600
Hakim, (chief,)	..	..	..	..	18,000
					<hr/>
					1,60,000

The distribution of the Tokhees, as follows :

	Ashoor-khan says,				Meerza Pairo says,		
Kishyanees,	50	..	..	66
Bata-khel,	30	..	..	36
Jalal-zai,	180	..	..	164
Pero-zai,	144	..	..	140

			Ashoor-khan says,			Meerza Pairo says,
Baso-khel,	..	..	33	..	..	33
Aiyooob-zai,	..	..	23	..	..	23
Meeran-zai,	..	..	104	..	..	104
Noor-khel,	..	..	81	..	..	81
Mahammad-zai,	..	..	330	..	..	330
Aka-zai,	..	..	31	..	..	31
			<hr/>			<hr/>
			1,006			998

The distribution of the Mahammad-zais is as follows:

Peerak-khel,	..	..	16	Shah Husen-khel,	..	16
Kaloo-khel,	..	..	17	Umur-khel,	..	5
Isse-zai, ..	..	..	18	Seekak, ..	..	18
Fakeer-zai,	..	..	15	Hasan-khel,	..	5
Babree, ..	..	..	7	Adam-zai,	..	?
Burhan-khel,	..	..	?	Hotak-zai,	..	30
Pato-zai, ..	..	..	70	Akrabe-zai,	..	9
Moosa-zai,	..	..	50	Moosa-khel,	..	16
Karmoo-khel,	..	..	12	Saece-zai, ..	..	3
Buhlol-zai,	..	..	9	Bazik-zai,	..	3
Nato-zai, ..	..	..	4	Khan-khel,	..	18
Peerwalee-khel,	..	..	9			

The Jalal-zai horsemen were thus divided :

Peroz-khel,	..	..	25	Nano-khel,	..	18
Bahram-khel,	..	..	43	Siya-zai, ..	..	28
Dawut-khel,	..	..	15	Bahlol-khel,	..	44
Najo-khel, ..	..	..	9			

The Pero-zai horsemen were thus divided :

Sayud-khel,	..	..	57	Irakee, ..	..	31
Asho-zai, ..	..	..	24	Sure-zai, ..	..	29

The Meeran-zais say that in the time of Sayud Rahmat-khan they furnished 133 men in the following proportion :

Nuhradeen,	..	..	14	Sen-khel, ..	..	39
Akhe-zai, ..	..	..	30	Moghal-zai,	..	28
Uhwa-zai and Kute-zai, ..	..	..	22			

The distribution of the Hotakees was as follows :

Malee-zai, 24	Marooz-zai, 11
Khade-zai, 9	Utman-khel, 12
Tadzak, 12	Isak-zai, 70
Barat-zai, 16	Aka-zai, 16
Ramee-zai, 70	Baee-zai, 25
Umar-zai, 12	Baba-zai, 6
Toon-zai, 34	Saghad-zai, 32
Tahiree, 7	Alee-zai, 6
Saut-khel, 16	Polad, 3
Eesaf-khel, 16	Tahiree, 6
Issozai, 1	

Again the distribution of the Isak-zai Hotakee's 69 men is as follows :

Kutte-zai, 14	Hade-zai, 25
Kudeen-zai, 7	Umar-zai, 7
Kundle-zai, 14	Mandeen-khel, 2

The Sursat, or provisions for the royal army in its march through the Ghiljye country was thus collected :

Kala-i-Ghiljye, 4-5 Hotaks, 0-5 Tokhees.

Sar-i-Asp, Babakar-zais.

Tazee, Mahammad-zais, Moosaka, Pero-zais and Jalal-zais.

Nothing now remains but to note the locations of the different tribes.

The Tokhees are to be found in the Arghandah valley, the Tarnak valley, the Khakak valley and in Nawak.

The Hotakees are, generally speaking, found in Marghah, and in the Syorye, (shady side) and Peetao, (sunny side) of the Bare-ghar and Surkh-koh hills, and more particularly speaking, the Isak-zais are found in Marghak and Ataghar.

The Malee-zais in Girdezangal and Gha Bolan.

The Barat-zais in Roghanai.

The Aka-zais in Kharnai and Dumandia.

The Tun-zais in Syorye.

The Umarzais at Mandav.

The Sagharees (Saghadais) at Mandah.

The Ramee-zais at Ataghar, and the Baee-zais at Sorah and Kingar.

The Surkh-koh is called in Pushtoo Sirah-ghar.

The Babakar-zais are found at Swad-zai, Jungeer, Sar-i-As (asp,) Shah Mardan and Nawah.

The Shamal-zais are found at Shibar, Halatagh, Jetz and Mundan.

Other information of a geographical and minute statistical nature regarding the Toran Ghiljyes is in my possession, as are the original Daftars which could not be generally interesting. The following one fact may be.

The scarpd hill and barrack walls against which the Ghiljyes ran their heads, on the 21st May 1842, losing 400 killed, were their own handy work chiefly, (the garrison having merely finished them,) of the preceding autumn.

It being impossible to procure labourers from Candahar, I had occasion to call on the tribes to furnish labourers in the exact proportion they had formerly furnished soldiers to the Duranee kings, and they were mustered every morning by their respective chiefs, *rod* in hand. Being highly paid, (one rupee to every three,) they continued to work long after the winter set in, sleeping in the plain below the hill in open *graves*! two feet deep for warmth. Her gracious Majesty's head on the new Company's Rupees made a few demur taking them at first; but finding out their value they soon got over this prejudice against "the image;" and after spitting on the rupees and treading on them, took the "Buttars" as they called them home as lawful gain, without a self-ac-cusation, it is to be hoped, of their having encouraged idolatry.

That money was little valued by the Afghans of the wilds (Sahra) before the British forces entered Afghanistan, the following will prove.

On my way from Cabool to Candahar in the winter of 1837-38, I several times failed in getting milk and butter, while my attendants who had travelled before in the country were plentifully supplied. I found the reason to be that I offered money, while they gave needles, and odds and ends of coarse Cabool chintz.

On one occasion after marching all day, I lost my way and got benighted, and separated from my baggage. On arriving at one of these Ghiljaee-khels or wild encampments, they allowed me to enter their tents, but nothing would induce them to kill a sheep for money, (they even refused to take a gold ducat,) insisting on having cloth; and the sheep was finally purchased by one of my attendants giving an old Ca-

bool choghak. On leaving Candahar for Quetta, I laid in a stock of needles, little looking-glasses, pewter rings and wooden combs; and again on leaving Kalat-i-Naseer for Shikarpoor, I was obliged to lay in a stock of pieces of coarse native white cotton cloth. For a whole piece I used to get a sheep; and eggs, fowls, milk, butter, &c. were only purchasable by the yard of cloth. In the autumn of 1841, even in the Ghiljaee country, melons were sold for equal weight of wheat, and grapes for three times their weight in wheat.

On the army first arriving at Candahar, the wild hill Afghans who got paid for the supplies they sold in Company's rupees, took them to the town shroffs, and paid one and two annas batta to get them changed for the "Kalamah-dar" or Candaharee rupee, thus giving eighteen annas for eleven or twelve; not being able to count, they talked of having a "kid-skin" of rupees.

List of Places on a portion (upper) of the Arghandah River.

<i>Left bank.</i>	<i>Right bank.</i>	<i>Left bank.</i>	<i>Right bank.</i>
	Arghasoo.	Parsang,	Mamachakh.
	Takhoon.		
Meezan,	Salem.	Sangeesar,	
	Shekhan.		Surkhakai.
	u Dolanna.	Tarkhuloon,	
	o Shadee.		Chaghbad.
	o Totee.	Barakee,	
	i Dohlah.		Nangyan.
	o Kondilan.	Saigaz,	
	o Jadang.	Kailatoo,	
	o Jakhtoo.	Jiggah,	Narrai.
	Chalakoor.	Bargah,	Sardarra.
	Maidan.	Girdai,	Biland warkh.
		Shukushta,	Ulachee.
Takhoonak,		Badar,	Shaigan.
	Surkhsang.	Nalee,	Thakr.
Taj Mahammad,		Kadalak,	Sapitao.
Walagai,		Pumbazar,	Duberak.
		Tanghutai,	Pezgul.
Madat,	Molai.	Karulghan,	Chaghmagh.
	Bagh.		Oman, or
			Jirghanai.
Mossai,			Kaftalak.
Gazah,			Solan.
	Beetab.		Bareezar.
	Gumbat.	Kharnai,	

The Arghandah river rises in Malistan, then comes to Fort Alee Gouhar, then to the Fort of Bakar Sultan, called Sangi Mashak, west bank; thence Turgan, west bank; thence Gazah, west bank; thence Balhasarr, west bank; thence Mughaitoo, west bank, (near Kharnai.)

The Attah Hazarabs (uppermost) join into the Kalandar Hazarabs (who are next below them on the river) at Kharnai. The boundary of the latter and the Peroz-khel Tokhees is at Avkol, the boundary of the latter and the Bahlol-khel is at Fort Husen, the boundary of the latter and the Perozais is at Aldai (Nulla Zardad,) the boundary of the latter and the Khan-khel is at Beetab.

Route from Kalat-i-Ghilzye to

Dera Ismail-khan, Kalat-i-Ghiljaee, Urgakoo, Dab-i-Pishai, crossing the Pass; Fort Konah in Marghah, Fort Maiyar in Halatagh, Wuch Marghah, (or Kaimkhelee,) Darwaze, beyond Jetz; Sargadee, Ismail-khan, Kanokee, Gul Wanah, Kurman-i-Sar, Ashewat, Kashkalwee, Handeerah Kalan-i-Kakeree, Chukhah, Jyob, Shagee, Sarmaghah, passing Gholaree Pass; Neelye, Tormyumah (Gomal,) Kats-speenkee, Manjigarah in Daman, Kulachee, Gada-i-Gandipoora, Dera Ismail-khan, Sakaree, Jetz, Yaiyak-beree, Shaheedan, Turwoh, Kasakuk, Dakha (deserts,) Taraghaz, Dochnah, Lakatijah, Goostoe, Se-nika, Tsatsandai, Doo-mandee (Ghuznee road falls in here,) Kotkee, Kanzoor, Sarmaghah.

The Nasarees (Daoot-khel) having bullocks, first move to Hindustan by the Gholaree or Zawah Pass; then the other Nasarees, then the Kharotees, then the Myan-khels.

JOURNAL

OF THE

ASIATIC SOCIETY.

Report, &c. from Captain G. B. TREMENHEERE, Executive Engineer, Tenasserim Division, to the Officer in charge of the office of Superintending Engineer, South Eastern Provinces; with information concerning the price of Tin ore of Mergui, in reference to Extract from a Despatch from the Honorable Court of Directors, dated 25th October 1843, No. 20. Communicated by the Government of India.

SIR,—Agreeably to instructions conveyed in your letter, No. 3018, of the 7th of February last, I have the honor to subjoin such information as I have been able to obtain, concerning the probable cost of the tin ore of Mergui.

2. With the view of ascertaining its value in the home market, I transmitted, about the period of my first report on the tin of this province, a box of average samples of the ore, to a smelting establishment in Cornwall, (Messrs. Bolitho & Co.) having extensive connection with the tin mines of that country. In April 1843, Mr. Thomas Bolitho informed me, that—"The samples of once-washed ore produces about 70 per cent. of tin, and the twice-washed yields nearly 75 per cent. The metal is very good, being almost free from alloy; some of the samples which have been sent to me from the Malayan peninsula contain titanium.

"The ore appears to separate from the matrix very easily.

"The consumption of tin throughout the world increases so slowly, and the supply at present being more than equal to the demand, there is little inducement to speculate in tin mines.

"The produce of Cornwall is 6,000 tons per annum, and we calculate that the quantity produced at Java together with what is raised in the Malayan peninsula, will rather exceed the produce of Cornwall. The average price of tin in Cornwall has been about 72s. per cwt., but it is now as low as 56s., which is the present price of the best Straits tin, and tin mines are suffering greatly from the depreciation in the value of their metal.

"It may serve for your guidance to know, that at this moment tin ore of the description of the sample twice-washed, would fetch in England about £ 46 per ton."

3. The following calculations of the probable result of a shipment of tin ore, and of the metal, have been obligingly made for me by two mercantile gentlemen of Maulmain. They are based on the lowest prices which, according to Mr. Bolitho, were obtainable in the market in April 1843, and show a probable profit on tin ore of 7s. 8d. per cwt.; but a loss on the shipment of the metal of 12s. 4d. per cwt. in one case, and 4s. 9d. per cwt. in the other.

July 1843. *Tin ore* from Maulmain purchased at 45 rupees per hundred viss, equal to 365 lbs.

	£.	s.	d.
45 Rs. per % viss = per cwt. 14 rupees, or	0	28	0
<i>Charges.</i>	£.	s.	d.
Duty,	0	3	0
Stout boxes and shipping charges in Maul- } main, }	0	1	0
Freight home £ 2 per ton,	0	2	0
Insurance $2\frac{1}{2}\%$ on 40s.	0	1	0
Commission and London charges $5\frac{1}{2}\%$..	0	2	2
Interest commission 5 % on purchase, ..	0	1	2 0 10 4
	<hr/>		
		0	38 4
Sale price per Mr. Bolitho,		0	46 0
	<hr/>		
Leaves a profit per cwt.		0	7 8

July 1843. Tin from Maulmain purchased at 77 rupees per hundred viss.

	£.	s.	d.
77 Rs. per % viss = 23 Rs. 14 annas, or			
per cwt.		0	47 9
<i>Charges.</i>	£.	s.	d.
Duty,	0	10	0
In Maulmain shipping, &c. per cwt. ..	0	0	6
Insurance $2\frac{1}{2}\%$ or 6%	0	1	6
London charges, viz. commission $2\frac{1}{2}\%$ }	0	3	3
Ware-house and Dock dues $1\frac{1}{2}\%$ other }			
incidental expences $1\frac{1}{2}\%$ }			

Interest on Purchase.

Six months @ 5 per cent.	0	2	4		
Freight @ £ 3 per ton,	0	3	0	0	20 7
				0	68 4
Sale price per Mr. Bolitho,				0	56 0
Leaves a loss of per cwt.				0	12 4

Another calculation of November 1844.

	R.	A.	P.
Usual cost of tin in Maulmain, Rs. 77-8 } per 365 lbs, on Rs. }	23	5	2 per cwt.
Freight to England @ £ 1-10 per ton,	0	12	0
Duty, @ 10s.	5	0	0
Shipping charges here and in London, ..	0	8	0
Commission in London @ £ $2\frac{1}{2}$ per cent. ..	0	13	0
	30	6	2

	£.	s.	d.
Or,	0	60	9
Assumed price in London, ..	0	56	0
Leaves a loss per cwt. of	0	4	9

4. The assumed rate for the ore at Maulmain, 45 rupees per 365 lbs., would be I think subject to a reduction; but that for the metal,

is probably the lowest average. It will be observed also, that the London price of 56s. per cwt. is taken at a period of great depression in the value of the article which had averaged 72s. per cwt.; but it would nevertheless appear, that to send it to England in the state of clean ore would be by far the safest investment.

5. Many localities in the Mergui province in which the ore exists abundantly, have been already described and publicly made known; but little or no attention has been given to the subject by merchants of Maulmain. Their business consists principally in timber, piece goods and hardware, and they have no inclination to embark in mining speculations. A small shipment of ore, being part of about 2½ tons collected by convicts and others at the Government expense, was made to England by Messrs. Bilton and Co. of Maulmain; but the quantity was so small, that no result has been made known by their home correspondent. At Malewan in the Pak-chan river at the southern extremity of Tenasserim, between one and two hundred active Chinamen are engaged in collecting the ore in the streams described in my third report of 8th April 1843, *Journal As. Soc.* Vol. XII. p. 523. They have been very successful, but there is little communication with that part of the coast that no accurate statement of the result of their annual labours can be obtained. They convert it into metal, which comes with Tacopah and other tin into the Maulmain market.

6. Other localities equally productive and available to the private speculator have been indicated in former reports, and more are becoming known. A specimen recently obtained by E. O'Riley, Esq. from Henzai, north of Tavoy, is forwarded. It is said to be plentiful there; but, without multiplying instances, sufficient evidence has been recorded of the existence in the Tenasserim provinces of rich stores of the ore of this useful metal, and it has been also shown that there is no obstacle to its profitable production.

Mining or other operations of this nature supported by the Government, have generally proved unsuccessful in India; but the time may perhaps arrive, when the attention of private capitalists may be turned in this direction.

G. B. TREMENHEERE,

Ex. Engineer, Tenasserim Provinces.

*A Supplementary Account of the Hazarahs. By Major R. LEECH, C. B.
Late Political Agent, Candahar.*

[Drawn up under circumstances of peculiar difficulty.]

A former account of the tribes inhabiting the Hazarajat, was furnished to Lord Auckland's government, and printed with the other papers of the late Mission to Cabool, (Captain Burnes's).

I had hopes of procuring a written history of this tribe which I have reason to suppose exists, when I was obliged to quit Candahar with General Nott's force in August, 1842. It was, if I remember, said to be in the possession of the Chief of the Dai Kundee Hazarahs, whose son was at that time a hostage in Candahar.

The Hazarahs claim brotherhood with Europeans, saying that both are descendants of Japheth, the son of Noah.

The Hazarahs are called Moghuls by the Ghiljyes.

I believe that the Hazarahs in former times were like the Afghans of a subsequent period, planted on the confines of India.

They, I believe, held the high road from Cabool to Candahar and Herat up to comparatively speaking a recent period.

Many of the names of villages in the immediate neighbourhood of Candahar prove a Hazarah founder; and the tomb of one of their progenitors, Choupan, is on the high road between Candahar and Herat near Greeskh: the place is now called Khah-i-Choupan.

In a paper on the history of Kalat-i-Naseer, I mentioned my opinion that the Hazarahs extended as far as Shawl Quetta, from the name Takatoo of the mountain bounding that valley towards Pishing and Candahar; and from Kuchlah (which means caves in the Hazarah dialect), being the first stage from Quetta towards Candahar.

The word "Shev" both in the Hazarah and Brahavée dialects (Koodd-gal) means below, lower; for we find the Shev Hassarrs or lower Hassarrs, distinguished from the Bal Hassarrs or upper Hassarrs.

There is in the neighbourhood of Candahar the shrine of an Hazarah saint, who has the title of Hai-taz, (the rush rider). I have mislaid the detailed account of the miracle that got the saint this title.

The Hazarahs' simplicity is proverbial, and it is probable that they were cheated by the Afghans and Ghiljyes out of quite as much land as they were beaten off.

They hold fire-arms in greater esteem than their rivals, and do not, as they do, trust to the vaunted Toora (sword) entirely. They make excellent powder, and are capital shots; and, strange for a people inhabiting a hilly country, are good riders.

They feel ashamed of their Tartar cast of countenance and want of beards; and I invariably observed that the higher in rank a Hazarah chief was, the less he resembled his race.

They call the Afghans, "Avghoons." Such is their aversion to the Tartar cast of countenance, that it is reported they ask no question of their wives for presenting them with children, the images of some of their Afghan handsome neighbours; and the opportunities afforded a passing stranger, even, by some tribes are said to be most shameless.*

As an instance of their want of polish, I instance the case of a Hazarah chief who visited me in the end of 1841 at Kalat i-Ghiljye. This man resided at so small a distance from town (Candahar), that had he been inclined he might have visited it once a week at least. As his services were required for our garrison, I made him a present of a shawl, and sent him round the fort to see the buildings and the commencement of our fortification. On his return, after signs of great uneasiness in his chair and sundry whisperings with his confidential attendant standing behind him, he at last confessed that he had a request to make before taking leave, if I would not be offended. This was, that in his tour round the fort he had been struck with wonder at a large copper *deg* (cauldron) used by the executive engineer to mix lime (the weather requiring warm water to be used), and that he hoped I would give it him instead (if I liked) of the shawl. It was of the common size used at cooks' shops at Candahar.

The vessel was accordingly purchased for him, and presented after being scrubbed as well as time permitted; and he left with it highly delighted, vowing he would make soup of a whole sheep in it and feast all the tribes. I never heard that the lime had any bad effect on the soup eaters. I have no doubt that this *deg* will after a generation or two have wonderful tales told of it in connection with the Faringees, who built Kalat in the autumn to destroy it in the spring.

* The Afghans give their Dutch build in the following couplet:

"Pushti koonash naghara darad,
Hazarah dumba darad."

I propose that this account should consist of the different memoranda found in my journal connected with the Hazarahs, according to the order of dates.

Memorandum, 19th July 1839, Candahar.—To the north of the Arifkhanee Baloch of Kejran, (to the north of Teereen) are the Babalee Hazarahs under Husenee-khan, and his nephew Mahmood-khan; and to the north of the Babalee are the Chora Hazarahs; 2000 families under Allee Husen-khan and Mahammad Husen. They are taxed one sheep each house.

Mahmood and his uncle Husenee both live at Zarafshan. Mehdee-khan was the father of Mahmood. The Babalee Hazarahs are reckoned at 5000 houses, and they are said to be able to furnish 200 horse and 300 foot. The Sardars of Candahar collected yearly about 2 or 3000 sheep. The sister of Mahammad Husen-beg Dai-koondee is Mahmood-khan's wife, and Mahmood-khan's sister is the mother of Khairullah-beg Dai-koondee. Gizon, called the Cashmeer of Western Afghanistan, was originally a government post. It is now enjoyed by Mahammad Takee Beg, a Dai-kundee Hazarah. It was through the Hazarahs that the revenue called Sang-o-baz (the goat and stone) became known. When a tribe is next to independent, it is said to pay a stone-and-goat revenue; that is, the collectors of revenue are met with an old lean goat in one hand, and a stone in the other, as much as to say, if you do not put up with this shadow of tribute you shall have this (the stone) on your head.

Memorandum, Chapa-khanna Karabagh, 24th June 1841, and 1st September 1842.—The four Dastaks of Ornee are Tamakee Taltamoor, Doka, and Sagadee. These, with Aldye, Mahammad Khoja, and Meer Mahammad, are sons of Hajee. Their chiefs are Husen-khan, Hasan-khan, and Mahammad Takee-khan, sons of Meer Aleekhan, son of Zakeekhan. The Mahammad Khoja Hazarahs are under Mahammad Husen-khan the son of Gulistan-khan, the son of Abdul Masam-khan. These are the Hazarahs of Karabagh; they are at enmity with the Tarakees, which was amply verified on the approach of General Nott's force to Karabagh in 1842. The Ghiljyes had forsaken their forts from fear of the force, and on coming up to Karabagh the Hazarahs were seen hurrying across the plain on their beasts of burden with empty bags to sack their neighbours' forts. Some of the Hazarahs accompanied the force

one or two marches further, in hopes of getting the contents of the other Ghiljaee forts in advance.

Memorandum, 28th June 1841.—There are four *Dastaks* of Jagharee Hazarahs; Gara'ee, Baghochury, Izdaree, and Attak.

The three other *Dastaks* are Kalandars, Pashahee and Sherdagh. The seven are called Mama. Sultan Bakar is by tribe an Attak; his father was Augoobeg, son of Sufee Sultan: he has four sons, Sharhat-i-Alee, Jamshed, Bijan, and Ismail.

The Arghandah river rises in Malisthan, then comes to Fort Alee Gouhar-khan, then to the Fort of Bakar Sultan, called Sang-i-Mashak, west bank; thence Turgan, west bank; thence Gazah, west bank; thence Bal hassarr, west bank; thence Kunghaitoo, west bank; Shev hasarr, west bank; thence the Tokhees to Siya Sang of the Khan-khels, east bank; thence Mezan, east bank, to Dahlak.

Memorandum, 18th August 1841.—Karez-i-Salai is a Supzee, among the Dai Choupan Hazarahs, his residence is Shae: to the west he has Meerza Sultan Sohbat-khanee Hazarah of Karez and Chalakoore; to the east Uruzghan Gundah Hazarahs; to the north the Khojakais under Tamas-khan; and to the south the Khan-khel Tokhees of Bagh.

The Dai Choupans, in all 2,500 families, are divided into three clans. Wachak, under Murtuza-khan.

Orasee, ditto, Murza Sultan.

Baintan, ditto, Zardad Sultan.

The Wachaks are divided into four.

Paindah Mahammad, Bubash, Daozai and Sheerah.

The Orasee are divided into three: Isfandyar, Ghulam-i-Wakee, and Baitamoor.

Baintan had five divisions: Wuttee Murghans, Sherak, Malik Mahammad, and Mahammad Beg, of which are Sult Alee and Zardad Sultan.

The Dai Choupans are originally from Greeshk; the tomb of their progenitor is still in existence, (Khak-i-Choupan.)

Sadelchee was the first chief of Kalat-i-Ghiljye.

Paindah Mahammad, Daozai, Sohbat-khanee, and Mahammad-zais of Shooee are all Akkahs.

The river of the Paindah Mahammad is Seran, of Meerza Sultan Baghoochar, and of Zardad Sultan Sousah.

Besides the revenue of the Dai Choupans (3,000 sheep, goats and lambs,) that of Chalakoa (a desirable place by all accounts to spend the winter, in preference to Kalat-i-Ghiljye) under Kongharee was 600 sheep, goats and lambs, and 12 Kharwars (120 maunds) of grain.

Memorandum, 15th October 1841; Kalat-i-Ghiljye. The boundary between the Kalandar and Jaghuree Hazarahs is at Oloom of the Salai Kalandar Hazarahs; the place is not on the river Arghandah, it is near, and almost the same as Gardoon-i-Nungoo.

The boundary of the Kalandar Hazarahs and the Tokhees is at Av-khol on the Arghandah, which belongs to the Kalandar Hazarahs.

The places of the Kalandars are Mughailoo, Gardoni Kotal, Oloom, Gardoon-i-Murgo, Doom-i-Sago, Surkh Kol Ablecto, Gardo, Bayh, and Moklai. The chiefs, their titles and residences are Alee Bakheh, son of Ghulam Husen Khan, at Ablecto.

The Kalandar revenue is payable at Ghuznee in hair carpets (palas) and sheep.

Korghushtoo is a place of the Myanishees of the divisions Shekho and Ghulam.

They may be 100 families; they never regularly paid revenue to the Sardars of Candahar, but are assessable by the king.

The Shekhos are ryots of Zardad, who takes one lamb from each house.

Sheep won't live in their country, but goats will; they die of rot in the livers immediately it reaches the gall. The cure is the gambelahs.

Memorandum, 6th November 1841.—Kalat-i-Ghiljye; the following is road to Mughaitoo Halan Rabat. Sebandee, Jijgah Gorgaran, Kasalghan on the Arghandah, Mughaitoo.

From Gorgaran Mughaitoo bears west, Hingai east, Bakhtoo north, and Karatash south.

The titles of the Hazarahs are Khan, Sultan, Ikhtyars, Wakee, Meh-tar and Turkhan.

The Kalandars have to their west Ghulam-i-Wakee and Bubash Hazarahs, to the north Uruzghan under Zoulee and Sult Alee, to the east Attah, and to the south the Jalalzai Tokhees.

The Hazarahs of Candahar are on excellent terms with the Parseewans, (I have also heard them called Parsus) those at Candahar were origi-

nally brought from Persia by Shah Abbas the Great; they are of the divisions Ruzbyanee, Zanganah, Burbur and Siah Mansoor.

During the early wars of the Hazarahs and Ghiljyes, the latter burnt the dead bodies of the former that came in their possession, and only discontinued the practice (disgraceful to both parties as men and Mosulmans) on the former retaliating. The system of offering indignity to dead bodies is a favorite one with the Afghans.*

The Hazarahs as well as Ghiljyes do not eat fish, although they agree it was made lawful food by their prophet.

In going down the river Arghandah we were struck with the fine fish in that clean part of the stream, and desired to have some; no one in the whole tribe could be found who knew how to catch them: at last a dyer who poached for his own use, (he was an inhabitant of Candahar, not an Afghan) volunteered his services with small pea-like balls of

* On the very first day that I entered Afghanistan (the Khyber Pass in the autumn of 1837,) I observed that all the bodies of the Sikhs who had been killed near the Pass, (in the battle of Jamrood between Mahammad Akbar-khan and Huree Sing) had been heaped together.

On the breast of the corpse of Goda-khan Momaod Afghan, they lit a fire; he having been killed in our service.

The grave of the first officer who was buried after the army reached Candahar (he was murdered) was being dug into, when the resurrectionists were disturbed by my gardener going to turn water off into the garden, and a repetition of the attempt was alone prevented by my making the owner of the field responsible for the preservation of the tomb.

During the siege of Kalat-i-Ghiljye, the fire that had been kindled to consume the corpse of a Hindoo native officer was extinguished by the besiegers, and the bodies of the camp followers they had cut up were the next day hacked with their spades by the cultivators who came to the spot to turn water into their fields.

The graves of those who were killed in 1839 at Ghuznee were in 1842 found defiled. It became at last necessary on the march to bury under cover of tents, and to use every ingenuity to conceal the spot which in many cases was of no avail, and no preventative against exhumation. I have lately heard that all the graves at Candahar have been opened by Umar-khan, the son of Sardar Kobudil-khan, who intended to burn the mouldering bones with horse litter; but the Mullahs obliged him to content himself with scattering them about the plain.

Graves of Mohammadians in Afghanistan are opened for the sake of the shrouds, by a set who are thence called Cafan Kash, and great excitement was occasioned in the winter of 1837 in Cabool, by a young married woman of rank having opened a newly made grave. She had been persuaded that, if she succeeded in giving to her rival (husband's second wife) to eat halwah cooked on the breast of a corpse, she would become the *sufed-bakht* (white-fortuned) or favorite. Hog's lard rubbed in the hair is considered a specific for estranging affection.

flour mixed with gall and Marg-i-Mahee, (the fish-bone nut) which he threw into the stream, the surface of which was soon covered with floating fishes in a state of intoxication, (not dead). Bringing them to land was good fun for the boys who had assembled.

Observing in the crowd of spectators the village Mulla (who are generally half-read) who evidently regarded us as cannibals, I enquired why they did not eat fish; he replied, he could not tell me, but it was undoubtedly lawful food. A good stock of fine large fish being now laid before us, I begged the Mulla to make them lawful eating; this, he ought to have known, could be done by merely dashing the live ones thrice to the ground. He however looked disconcerted at my request, and hesitated. After a short time, during which we all kept our countenances, he called for a knife and was about to cut their throats, when I suggested that the bellies were the proper places; and he actually, after pronouncing his solemn "Bismillah Alláh Akbar," went through this first part of the cook's duty: and, as he looked after us as we departed to breakfast, I have no doubt he said to himself, "These Faringees are after all not such a dirty feeding set of Kafars as they are said to be."

The Hazarahs, notwithstanding the general enmity between the tribe and the Ghiljyes and Afghans, have their friends and allies among them; three Maliks of the Alee-khel Ghiljyes have gone over to Sultan Bakar, the deadly enemy of their tribe, having quarrelled with their brother Malik: their names are Mato, Natho, and Shahabudeen.

The Hazarahs have been driven out of part of their country by the Wardaks (from the stages of Haft Asya, Hyder-khel, Shashgou, &c.) These Wardaks are said to amount to 9,000.

The Hooree Wardaks, who now occupy this part of the road from Ghuznee to Cabool, are divided into three clans; Malee-khel, Badud (Bahadur) khel, and Hyder-khel.

The Malee-khels are divided into Hasan-khel, Hasrah, Muradee-khel, and Shadee-khel.

The Badud-khels into Panchpae Zeerak and Khaja Khidr, and the Hyder-khels into Tokur-khel and Eesa-khel.

The Hoorees are reckoned at 2,000 snookes, or houses.

In their hills there is a grass called Tabarghan that sheep feed on, which imparts a fine flavour to the ghee, milk, and its other preparations.

There is also a red flower, called Sursan, which is boiled, and the strained water used as a cooling drink.

The slaves in Afghanistan are chiefly Hazarahs, and the Afghans say it is as lawful to buy and sell them as negroes.

N. B.—I have, I think, a good account of the Hazarahs dependent on Cabool in my "Vicovitch's Cabool," a work which I hope some day to have time to translate. It is composed of accounts of the different districts of Cabool, drawn up at the request of that Russian agent, during his residence at Cabool in the latter end of 1837 and beginning of 1838.

Rough Notes on the Zoology of Candahar and the Neighbouring Districts. By Capt. THOS. HUTTON, of the Invalids, Mussoorie. With notes by ED. BLYTH, Curator of the Asiatic Society's Museum.

No. 1. *Vespertilionidæ*. Two species of Bats are common at Candahar, a large and a small kind; the latter I preserved in spirits and have sent you, though I fear they are spoiled.¹ This species is very common, and may be seen from February till towards the end of

1. They arrived in excellent condition, and may be thus characterized:

Pipistrellus lepidus, Blyth. Length three inches and one-eighth to three and a quarter, of which the tail measures one and a half; alar expanse eight and a half to nine inches: fore-arm an inch and three-eighths, or a trifle less; longest finger two inches and a quarter; tibia half an inch; foot and claws five-sixteenths of an inch. Ears smaller than usual among the *Pipistrelles*, measuring from lowermost antea base half an inch, and their tips spreading to an inch asunder; tragus subovate, and curved as usual. Sides of the face very tumid. General colour a light yellowish-clay, pale sandy or isabella-brown; underneath paler: the volar membrane light dusky, and the inter-digital at base towards the wrist, also the tip of the wing, and a broad border between the leg and proximate finger, with the fingers themselves, of the same light hue as the fur of the body.

Captain Hutton's large species is not improbably the *Noctulinia noctula*, v. *N. altivolans*, (White) Gray, common in Europe; for I doubt much the distinction of Mr. Hodgson's *Vesp. labiata* from the *noctula*, and a very closely allied species, if not the same, has been described by Mons. F. Cuvier from Sumatra.

The description of habitat resorted to by the third species is that of *Rhinolophus perniger*, Hodgson, v. *luctus* (?), Temminck, further to the eastward.

It may be remarked here that Elphinstone mentions Monkeys, as found only on the north-east parts of Afghanistan; a statement which does not appear to have been since verified.—*Cur. As. Soc.*

October, flitting about in crowds in the twilight hours of evening; they shelter during the day in holes of houses, walls, and rocks.

The larger kind I have only seen occasionally on the wing, and never possessed a specimen. There is said to be another large kind found in the limestone caverns which occur in the mountains, but I suspect it to be the same.

No. 2. *Felis tigris*. Is said to occur in the jungles of Bhawulpore along the banks of the Sutledge, but I saw no traces of it. In the lower parts of the country, towards Scindh, I do not think it occurs. It is not in Afghanistan.²

No. 3. *Felis leo*. Is said to occur in some parts of Afghanistan; but

2. According to Elphinstone, Tigers are to be met with in most of the woody parts of Afghanistan: and Mr. Vigne remarks that the Tiger is "said to be well known" upon the Suffd koh mountain. Sir John McNeill saw one killed in Persia, at the foot of the Elboorz mountains, near the Caspian; and Morier states that it occurs in the vicinity of 'Iabreez, mentioning that he saw the skin of one that had been killed there a short time previously. Old Tournefort relates that the middle region, and even the borders of the snow limit, of Ararat, are inhabited by Tigers(?). He says that he saw them within 100 yards of him, and that the young are caught in traps by the people round the mountain, to be exhibited in shows of wild beasts throughout Persia. At Grusia, at the foot of Caucasus, a large one is mentioned by Kotzebue, and supposed by him to have been driven by hunger from the plain of Baghdad. Mons. Menetries (I think, for I have neglected to cite the authority in my note-book,) relates that—"During our stay at Lenkowa, I had the good fortune to obtain a Tiger that had been killed only fifteen vests off. It did not appear to differ from the Bengal Tiger, even in the skull. It appears, as I subsequently learned, that one at least is killed every year in the vicinity, having been pursued perhaps by hunters, till it sought refuge in the neighbouring forests of the Kour. It is not, I believe, found in Caucasus, the skins sent thence to Europe having probably been brought from Georgia, whence those of Leopards are also sent." Lt. Irwin states, that the Tiger is found as far as Tashkund, but in that temperate climate he falls much short of the Bengal Tiger in strength and ferocity. Burnes also speaks of "Tigers of a diminutive species," found in the valley of the Oxus; and Humboldt and Ehrenberg observed them so high as the latitude of Berlin: they are said to occur even on the banks of the Oby: and Du Halde speaks of them as common in Tartary and China. In Japan they are stated to be covered with a thick coat of long soft fur. In the Himalaya they reach to an elevation of 8,000 feet, but are rare as far north as Simala, and they are said to be smaller in the N. W. provinces than in Bengal. Dr. McClelland affirms that they are a great scourge to the inhabitants of Kemaon. Referring, however, to the more western portion of the range of this animal, and even to the northern, it is necessary to be on guard against the frequent misapplication of the name *Tiger*, which, in South Africa, for instance, invariably applies to the Leopard, and in S. America to the Jaguar; in Van Dieman's Land even to the marsupial Thylacin: and with respect to a remark above cited, referring to Leopard skins being brought from Georgia to the Caucasus, it may be noticed that Guldensmidt describes the Leopard to inhabit the rocky parts of Caucasus, chiefly to the south, about Tiflis; being of rare occurrence to the northward.—*Cur. As. Soc.*

I doubt it, as I never saw a skin nor any spoils of the animal, nor could I find any one who had seen it.³

No. 4. *Felis leopardus*. This animal is common in the mountainous parts of Afghanistan, and is destructive to flocks and cattle; it seldom attacks man, though the Afghans have a great dread of it. The skins are prized as saddle-cloths, and are thrown over the saddle, with the tail fastened behind to that of the horse.⁴

No. 5. *Felis chaus*, (vel *erythrotis*, Hodgson). This is not an uncommon species on the hills of Quettah and other parts of the country.

N. B.—“Seeah Gosh” is the name of a Lynx in Persia, *i. e.* “Black Ears.”⁵

No. 6. *Felis* — ? A spotted skin of a small Lynx, the only one I saw: it was brought in its present state from the Huzarrah hills.⁶

No. 7. *Felis catus*. The domestic Cat of the Afghans is very similar to that of the hill people in the Himalayan districts, running into all sorts of varieties as to colour, as they do with us, although the most general is a dark grey with black spots and stripes.⁷

No. 8. *Canis* —. The domestic Dogs of the Afghans vary according to the climate. In the hilly tracts they are large and fierce;

3. Elphinstone remarks, that the only part of Afghanistan where he had heard of the existence of Lions, was in the hilly country about Cabool, and there they are small and weak as compared with the African Lion. “I even doubt,” he adds, “whether they are Lions.” The Lion is well known to occur, however, both in Persia and in Western India; and, according to Lieut. Irwin, some are found as far as Tashkund, in a northerly direction and an easterly. *J. A. S.* viii, 1007.—*Cur. As. Soc.*

4. A Candahar specimen forwarded by Captain Hutton is of moderate dimensions, with rather long fur, very pale in colour, and the spots a good deal ringed, including those along the back line.—*Cur. As. Soc.*

5. This is the *Felis caracal*, Schreber, of which the Society has lately received a specimen, killed at Jeypoor, from Captain Boys. It extends sparingly over the Upper Provinces, but appears not to occur in the peninsula of India: westward it inhabits Syria, and the whole of Africa from Barbary to the Cape of Good Hope. *F. chaus* is common throughout India, from the Himalaya southward; and extends even to Arracan.—*Cur. As. Soc.*

6. This seems to me to be the British Wild Cat (*Felis sylvestris*, Aldrovand, commonly referred, but very doubtfully, to *F. catus*, Lin.; the former not occurring in Scandinavia). Its tail, however, would appear to taper, so far as can be judged from the open skin; whereas the tail of the British Wild Cat does not taper. Judging from memory, of the figure published by Mons. F. Cuvier, I much suspect it to be his *F. torquata*: but the colour and markings are quite those of *F. sylvestris*.—*Cur. As. Soc.*

7. The domestic Cats of India are smaller than those of Europe, and are very commonly of a grey colour without markings, except on the limbs, and some more or less confluent black dorsal lines; the feet and tail being also black, to a greater or less extent. This is a style of colouring never seen in those of Europe (of unmixed breed); and the

and approach somewhat in appearance to the degenerate breed of Bhotan dogs, such as is found in the lower hills of the Cis-Himalaya. Others are not very different from the common village dog of India, except perhaps that the bark is more decided in its tones, and the hair longer. These appear to be the mere effects of climate. There are likewise Turnspits and Greyhounds : some of the latter are good and fleet, with smooth short hair ; others are large and clothed with long silky hair. At Cabool, Pointers are said to occur ; but in the more southern parts I saw none.⁸

true *tabby*, so common in Europe, is never seen in India : I mean the tabby with black ground and broad pale streaks peculiarly disposed ; for the grey with black tiger-streaks is found in both regions, only that the Indian are of a purer grey than the European. The long-haired Kashmir Cats, when dark, are often of the same unstriped grey with black dorsal streaks, feet, and tip of tail, as the Indian ; and, I think, I may add that the Indian are more generally partially or almost wholly white, than is the case in Europe. Wholly black Cats are certainly less common than in England. By the way, Elphinstone states that Cats of the long-haired variety, called *Borauk*, are exported in a great number from Afghanistan, but are not numerous in Persia, where they are seldom or never exported.—*Cur. As. Soc.*

8. Lieut. Wood, in his 'Journey to the source of the Oxus,' p. 396, mentions a breed of Dogs, at Kunduz, called *Tazi*, "which could not but have found favour in the eyes of an English sportsman : it is a breed which, for strength and symmetry, vie with our Greyhound, and in beauty surpass it." Also, he speaks of the "Spaniel, from Kutch, and others of mixed breed, but possessing keen scent, and some of the qualities of our pointers." Lieut. Wood also informs us (p. 374), that "the Wakhun Dogs differ much from those of India, and bear a general resemblance to the Scotch Colly. They have long ears, a bushy tail, and a frame somewhat slender, being better adapted for swiftness than strength. They are very fierce, make excellent watchers, and will fight dogs twice their own weight. Their prevailing colours are black or a reddish-brown ; the latter often mottled. The breed is from Chittrah, and so highly are their game qualities valued, that the Scinde Ameers have their packs improved by importations from this country." To my friend Mr. Vigne, we are indebted for a description of "the Scinde hound, as it is usually termed, which," he remarks, "is a race peculiar to the country, and considerable care, I believe, is bestowed upon the breed. It is a large and fierce animal, smooth-haired and usually white, and with sharp ears : a cross between a thorough-bred mastiff and a greyhound, would much resemble it. In general figure, but with a more savage expression, it is not unlike a large English coach dog : an animal which somehow or other, in the older books of Natural History, has obtained the name of the Harrier of Bengal. Although not probable, yet it is not actually impossible, that the original breed may have been brought home by the early European traders from the mouth of the Indus, and that the name may thus have originated in a not unlikely confusion of localities." 'Travels in Kashmir,' &c. II. 411. The same gentleman gives a description of the magnificent sheep dogs of Kashmir, (*ibid.* II. 149), which however would appear to be identical with the ordinary Tibetan mastiff. Of this race, many are annually brought to Calcutta ; and with them I have seen a dog very nearly resembling the Esquimaux dog, which is found likewise in northern Siberia, where, for purposes of draught, it is fast superseding the Rein-deer.—*Cur. As. Soc.*

No. 9. *Canis aureus*?, var: I have no specimen. It is abundant along the course of the Helmund and Argandab rivers, at Girishk and Candahar, as also in the Bolan Pass, and appears to be identical with the variety found in the Himalaya. It may perhaps be the "*Oxygous indicus*," of Mr. Hodgson. It is found in packs, and cries at night like those of the plains of India, and in this it seems to differ from the Himalayan variety, for although I have often seen many of the latter together at Simla, I never heard them cry. May not a dread of the Leopard keep them silent in the hills?⁹

No. 10. *Vulpes* [*flavescens*, Gray.] The Fox of Afghanistan, or at least of the southern and western parts, is apparently the same as our Himalayan species, though somewhat less in size.¹⁰ My specimens are all females, and the measurements are as follow, namely:—Length from nose to insertion of tail two feet; tail seventeen inches, equalling three feet seven inches. Height at the shoulder fourteen inches. Another:—Length to insertion of tail two feet; tail seventeen inches and a half, equalling three feet five inches and a half. Height nearly fifteen inches at the shoulder. Farther description I omit, as you can supply it from the specimen sent. The species is numerous in the valleys around Candahar, hiding in burrows and holes in the rocks. The skins are soft, and are made into *reemchaahs* and *poshteens*. The price is usually six annas a skin. Called "*Robur*."¹¹

9. Wild Dogs, in addition to Wolves, Jackals, and Foxes, are stated by Elphinstone to occur in Afghanistan. A Nepalese Jackal skin presented to the Society by Mr. Hodgson, appears to differ in no respect whatever from the Jackal of Lower Bengal.—*Cur. As. Soc.*

10. Since writing the above, I have compared the specimens with the Hill Fox, and there appears to be a deficiency in the white tip to the tail in Afghan specimens? T. H.

11. In Afghanistan, according to the late Dr. Griffith, "a large and a small species of Fox appear to exist. The former, which is perhaps identical with the large Himalayan Fox, I procured from Quetta and at Olipore, at which place it is not uncommon. The small kind seems to resemble the Fox of the plains of N. W. India." Capt. Hutton's specimen is evidently of the small Afghan species, which is *Vulpes flavescens*, Gray, *An. and Mag. N. H.* 1843, p. 118, and thus described:—"Pale yellowish, back rather darker; face, outer side of fore-legs, and base of tail, pale fulvous; spot on side of face, just before the eyes, the chin, the front of fore-legs, a round spot on the upper part of hind-feet [or rather legs], and the tips of the hairs of the tail, blackish; end of tail white. Hab. Persia." The winter fur is long and soft, and is of two sorts; a shorter and delicate under-fur, which on the back is darkish, passing to white on the sides and under parts, and pure white on the sides of the neck and shoulders in some, in others but partially so; and longer straight hairs, black-tipped, and yellowish-white along the back, whiter on the sides: the breast and under parts, with the exterior of the limbs above the mid-joint, dusky: ears brown-black to near their base: face ful-

No. 11. *Vulpes bengalensis*. Is common in Cutchee, where, previous to the advance of our army from Shikarpore, I have coursed them with my friend Major Leech, late Political Agent at Candahar. It does not appear to pass the mountains into Afghanistan, or at least I neither saw nor heard of it. "*Loomree*" of India.¹²

No. 12. *Canis lupus*.—Wolves are common in the lower part of the Bhawalpore country, and likewise around Candahar. The dimensions of one from the latter place are thus:—Length, over all, four feet eight inches; height at the shoulder two feet three inches. The female is still larger. It appears to be the common Wolf of India. A pair of these animals crossed my path one morning in Scindh: they were going along at a smart hand-gallop, the largest, or female, leading. "*Bheyriah*" of India.¹³

No. 13. *Hycæna vulgaris*.—This animal is common in Afghanistan. Length to insertion of tail three feet three inches and a half; tail fifteen inches, equalling four feet eight inches and a half. This was a female, and apparently not full grown. I had an opportunity of comparing this specimen with a male from Neemuch, which my friend Dr. Baddeley reared from a cub, and took with him to Candahar. There was no perceptible difference except in size, the Neemuch specimen being the largest. Dr. Baddeley and one native servant were

vescent, with dark patch before each eye: and the tail very bushy, a little fulvescent, and white-tipped. In summer dress, the long hairs have more or less disappeared; and, in a male before me, the inner fur is considerably deeper-coloured than in Capt. Hutton's female. A third specimen was received from Almorah, but the skin had doubtless been carried to the great Hurdwar fair. As a species, it is very distinct from the Himalayan Fox, and also from another, nearly allied to the latter, from Chinese Tartary, described in *J. A. S. XI*, 589.—*Cur. As. Soc.*

12. Mr. Elliot remarks of the Foxes of the Southern Mahratta country, that—"It is remarkable that though the brush is generally tipped with black, a white one is occasionally found, while in other parts of India, as in Cutch, the tip is always white." In Bengal it is invariably black. This animal is identified by Mr. Ogilby with the *Canis corsac*, Pallas, and certainly it agrees with the description of the latter, despite the great difference of habitat.—*Cur. As. Soc.*

13. I believe Mr. Elliot to be right in identifying the Indian Wolf, *Canis pallipes* of Sykes, with the true *C. lupus*, which certainly runs into varieties in the wild state; not only according to climate, but even in the same locality. Those of Chinese Tartary are very pale fulvescent, and are densely clad with matted wool during the winter:—absolutely Wolves in Sheep's clothing. Two specimens of the latter are in the Society's collection.—*Cur. As. Soc.*

the only persons who could approach the brute with impunity. It was chained like a dog. I believe it effected its escape during Dr. Baddeley's return to Quetta on his way to Bombay. "*Laggerbagher*" of India.¹⁴

No. 14. *Herpestes griseus*?—Is this our Indian friend? It is very common at Candahar, with precisely the habits of *H. griseus*. The Afghans occasionally tame them, as do the natives of this country. It is called "*Moosh-khoorma*," by the Afghans. "*Nyool*" of India.¹⁵

No. 15. *Mustela* [*sarmatica*, Pallas.]—This occurs plentifully at Quetta and Candahar, where it burrows in the ground, and produces three or four young at a birth. I had three pairs of these beautiful little creatures living in the same box, and although occasionally a little bickering occurred, yet on the whole they were amicable enough. A few days before I left Candahar (February 1841), I killed and stuffed one of these animals, and the following morning, when a young friend of mine opened the cage for the purpose of taking out another, we discovered that the two remaining *pairs* had waged war during the night with the odd one, whose mate we had stuffed, and had killed and partly devoured it. This is a curious fact, for the three pairs had lived together nearly from their birth, without farther quarrelling than an occasional wrangle over their food; yet no sooner was one pair broken, than the others set upon and killed the odd one. The Afghans call it "*Gorkhus*," or grave-digger, from an idea that it frequents burial grounds for the purpose of feeding on dead bodies. They even suppose that it lives entirely upon human bodies, and that it digs down into the graves where it banquets in undisturbed solitude. This notion, as may readily be supposed, is an

14. According to Vigne, this animal is very rare, if found at all, in Kashmir. Very rarely, also, it occurs in the vicinity of Calcutta.—*Cur. As. Soc.*

15. *Mangusta pallipes*, Blyth. This species is quite distinct from *M. grisea* of India generally, (including Scindh,) having much shorter fur, and approaching nearly to *M. Edwardsii*, v. *auropunctata* of Hodgson, if it be not a mere variety of the latter. It is most probably, however, distinct, and may be known from *M. Edwardsii* by its paler colour, its white throat, breast, and under-parts, which are but faintly tinged with the hue of the upper parts, and also by the light colour of its feet. In form and dimensions, it appears altogether to resemble *M. Edwardsii*.—*Cur. As. Soc.*

absurdity, the animal possessing in every respect the same propensities as its European congeners. Its food consists of birds, rats, mice, lizards, beetles, and even snails, all of which it finds in abundance in the gardens around Candahar. The first I saw was brought to me by a gardener who had dug it out of a hole; and a pair of these little savages was also found in another garden, where they had brought forth their young in a hole in the earth. The propensity to destroy life, and the thirst for blood, was soon manifested in those which I kept confined.

One of these animals refused to feed during a day and a night, although his cage was plentifully supplied with raw meat and beetles; but on introducing four Wagtails (*Motacillæ*), he was instantly aroused by their fluttering, seizing and destroying them one after the other as quickly as possible, and then retiring with them into an inner part of the cage, where he regaled himself on the blood of his victims, and indemnified himself for his long fast.

He ate little of the flesh, however, but greedily licked up the drops of blood as they trickled from the wounds of his slaughtered prey. He also destroyed a couple of large Rats (*Arvicolæ*) in a similar manner, showing great skill in seizing them so as to preclude all chance of their either injuring him or escaping from his fierce attack. When the rats were introduced into his cage, he was coiled up asleep in one corner of the inner part, but hearing them bustling about he was soon on the alert, and, cautiously advancing to the small round hole which formed the entrance to his sleeping apartment, took a survey of his unsuspecting visitors. He then drew back as if to avoid observation, until one of the rats approaching his retreat, he suddenly darted upon him and pulled him, in spite of his squeaks and struggles, into his sanctum, where he soon despatched his victim.

After a short pause, he again placed himself so as to obtain a view of the remaining rat, which shortly fared a similar fate to its companion. With the latter, however, there was a severe struggle, and the ferret was obliged to leave his inner apartment; yet although he rolled over and over in the scuffle, he never quitted his hold, and so dexterously had he seized his prey, that to bite or shake him off was equally impossible. He seized both rats precisely in the same place, namely,

immediately behind the ear, which at once secured himself from injury and soon rendered his foe helpless. When the rat ceased to struggle, he bit him once or twice sharply through the back of the skull, and as the blood flowed from the wound, the ferret lapped it up with his tongue. There was never any attempt to *suck* the blood of his prey, as is commonly but erroneously asserted of his tribe, though he continued both with birds and beasts to lick up the warm stream as long as it flowed from the wounds he had inflicted. One would have thought that the slaughter and the blood of the three birds and two large rats would have satiated his ferocity for a time, but although he made no attempt to devour the prey he had slain, his appetite for blood and murder was still as keen as ever, and scarcely had he finished his second draught ere he sallied forth to slaughter two young rats which had been introduced along with the old ones. These, being as yet blind, he seized by the nape of the neck, and having killed them with one bite, carried them also into his den, where he stored them up in a corner with their murdered parents, and the remains of the wagtails. In the evening, after nightfall, when all was getting hushed and dark, he came forth, and then regaled himself on the store of provisions he had laid up.

I was amused one day at the successful defence of a Shrike (*Lanius lahtora*). On introducing the bird into the box, it kept for some time twisting and turning itself about, and flitting its tail from side to side, watching the ferret with evident alarm. At last it flew so near that the ferret sprung at and caught it by the wing, and then lay with his fore-feet upon the bird, and began to peer sharply round to see that no intruder was near to interrupt his meal. As he turned his head back to begin the feast, the Shrike who had watched his movements, seized him so suddenly by the nose, that the ferret in astonishment and pain shook his head and jumped up, thus releasing the bird which I permitted to escape as a reward for his valour, and he flew away chattering, as if laughing in his sleeve at the trick he had played his enemy.

These animals are, strictly speaking, nocturnal, though not unfrequently on the move during the day; this however may probably be owing to bad success during the night in finding food, so that hunger may compel them sometimes to wander forth during the day time. Those

which I kept, having plenty of food to eat, slept almost throughout the day, seldom venturing abroad until nightfall, when they became very restless. They produce young about the end of March or beginning of April, when the winter has passed away and the warm weather is setting in, bringing in its train numbers of quail and other small birds on which the animal preys.

The Afghans assert that they are never seen during winter, and that although the summer is the season when they appear, they are never abundant. This latter assertion I can take upon myself to contradict, as they are far from scarce, for I have had during the summer months more than a dozen specimens brought to me.

If true that they are only found in summer, it is probably because they remain in a state of somnolency during the winter. The Afghans, however, are so little skilled in Natural History, and so addicted to lying, that it is a matter of much difficulty at any time to gather the truth from them. Some informed me that though the animal was not seen around Candahar during winter, yet that they were plentiful in the hills wherever there was good jungle cover, and that in summer they wandered down to the plains.

Now this assertion carries an error on the face of it, for an animal delighting in cold climates would not resort to the warm plains in summer, nor would the inhabitant of a warm climate seek the hills in winter. As therefore they only appear in the plains and valleys during the summer, the probability is (if they do not migrate to the south) that they remain dormant during the winter in holes and burrows. The latter is indeed the most probable, for to the southward the Candahar valley is bounded by the sandy desert which stretches away from the Kojah Amram range of hills to beyond Herat, into Persia.¹⁶

These animals emit the same disagreeable fetid odour which characterises the genus. The body is long, slender, and extremely supple; the loins appearing, as in the feline tribe, to be so loosely articulated, that the hinder parts actually shake and totter whenever the animal puts itself

16. The truth, I suspect, will prove to be that the *Mustela sarmatica* occurs at all seasons, like its various congeners. Among the true *Carnivora*, I know only of the genus *Ursus* which fairly hibernates.—*Cur. As. Soc.*

in motion. The tail is capable of being expanded into a good sized brush, and in this state forms an excellent defence for the back.

I once put a large snake into a box with one of these ferrets; the snake at once withdrew to one corner and sought for a hole to escape by; while the ferret arched its back, kept the head erect, and spread the tail out like a thick brush, which it turned over its back. In this manner he approached and retreated from the snake several times, watching its movements in some alarm. The ferret often tried to seize the snake by the back of the head, and as often received a bite in return, until the little beast became quite terrified. The snake was harmless, but too powerful for the ferret to attack successfully.

The markings of this beautiful species are as follow, namely, through or across the face are three distinct and well defined bands; the lowest one runs across embracing the eyes, and is of a brown colour; above this is a second narrower band of a pure white; and a third of black passes across the forehead, along the anterior base of the ears, descending to join the same colour on the throat. The chin and muzzle are white, the nose brown. The fore part of the throat, neck, breast, fore and hind legs, are glossy black. The upper half of the ears is white, with long hairs like a fringe; the crown and nape are also white with brown spots; the hinder neck and all the upper parts of the back and sides, are yellowish-white with numerous brown or liver-coloured spots of indeterminate shape. The tail is greyish-yellow for two-thirds from the base, and the remainder to the tip black. Ears ovate, or rounded and open; eyes pale bluish or grey, by daylight. The head is broad, muzzle short, rounded and obtuse. Body long and remarkably slender, very supple, like the common ferret. The cry it makes when irritated resembles that of the mungoose (*Mangusta [pallipes]*).

No. 16. *Mustela*——? This is a skin which was given me by a Candahari, and came he said from the neighbourhood of Cabool. I suspect it to be the “Dil-kuffub” of Burnes’s Bokhara.¹⁷

¹⁷. This is lost; it was “sooty black with a white crescent or gorget on the throat.”
T. H.

No. 17. *Lutra* [*monticola*, Hodgson, J. A. S. VIII, 320; apparently¹⁸]. These animals are abundant in the larger rivers, such as the Helmund and Argandab. I could never obtain more than the dried skins, which are prepared for the Bokhara market, and sell for eight Candahar or six Company's Rupees each. They are made into dresses, and are so durable as to be handed down from father to son ! So at least runs the fable !

No. 18. *Erinaceus collaris* ? This species I found in the sandy tracts of Bhawulpore, but as I have only the description of it left, I am uncertain as to its identity with the above named species.

The animal was clothed with stiff quills on the upper parts of the body ; these were white on the basal half and jet black on the upper half : the face and under parts of the body were clothed with sooty-black hairs : ears large, ovate, and ashy-gray : snout long and projecting over the under jaw : eyes round, black, and of medium size : tail short and obtuse, nearly naked : chin white.

Another, in all respects like the last, except that the quills on the sides have pale brown tips. This may be the effect of age or sex, as the specimen was a female.

These were found in separate holes beneath a thorny bush called "Jhund," in the desert tracts of shifting sand between Sundah Badairah and Hasilpoor, on the left bank of the Garra, where they are numerous.

A third specimen seems to be distinct : all the under parts except the legs and tail are clothed with soft hair of a pure white, which passes also in a broad band across the forehead ; immediately below this is a band of blackish hue across the face, embracing the eyes ; and the rest of the face to the nose is greyish : nose naked : eyes round and black : ears large and ovate, ashy-grey : head rat-shaped : body and sides above armed with quills which are of a dirty white, or very pale shade of brown, for nearly two-thirds from the base ; then a dark brown band, and the tips pale brown. This colouring gives the animal a pale brown appearance. The legs and tail are sooty or blackish, as in

18. *L. monticola* would seem to be the most common species of the Himalaya, and the Society has a specimen procured so low as near Moorshedabad, on the Hoogly. It is readily known by the comparative harshness of its fur.—*Cur. As. Soc.*

the foregoing: claws of moderate length, sharp and whitish. This specimen was smaller than the other two, and appeared to carry the back more arched than they did. It was found in the neighbourhood of "Shah Fareed," on the left bank of the Garrah. It is not unlike the European Hedgehog.¹⁹

The habits of all three were the same. They are nocturnal, and during the day conceal themselves in holes or in the tufts of high jungle grass. Their food consists of insects, chiefly of a small beetle which is abundant on the sandy tracts of Bhawulpore, and belongs to the genus *Blaps*. They also feed on lizards and snails. When touched, they have the habit of suddenly jerking up the back with some force, so as to prick the fingers or mouth of the assailant, and at the same time emitting a blowing sound, not unlike the noise produced when blowing upon a flame with a pair of bellows. When alarmed they have the power of rolling themselves up into a complete ball, concealing the head and limbs as does the European Hedgehog. On hearing any noise, it jerks the skin and quills of the neck completely over its head, leaving only the tip of the nose free, which is turned quickly in every direction to ascertain the nature of the approaching danger. If a foe in reality come nigh it, the head is instantly doubled under the belly towards the tail, and the legs being withdrawn at the same time, it presents nothing but a prickly ball to its assailant, and which is in most cases a sufficient protection. In this state it remains for some time perfectly motionless, until all being quiet and the danger past, it ventures first slowly, and almost imperceptibly, to exert the nose, the nostrils working quickly as if to ascertain that all is safe again. It then gradually uncoils until the eyes are left free, and if satisfied that its foe has passed on, it opens up and walks off with a quick but unsteady gait; or if again startled by the slightest noise near it, it is instantly entrenched within its thorny armour. They use the snout much in the same manner as the hog does, turning up the leaves and grasses in search of food, and shoving each other out of the way with it when angry. They make a grunting sort of noise when irritated. They are remarkably tenacious of

19. The description of this third specimen applies very well to other specimens, which I have referred to *E. collaris*, Gray.—*Cur. As. Soc.*

life, bearing long abstinence with apparent ease,—a provision of nature highly useful and essential in the desert tracts they inhabit. It is probable, too, that they remain during the cold season in a semi-torpid state, as the species which occurs in Afghanistan hibernates.

N. B.—From the forehead proceeds a powerful muscle, passing round the body along the medial line at the junction of the quills and hair; this enables the animal to protect itself in the following manner:—the head being bent downwards to the belly, and the legs tightly doubled under, the contraction of this muscle causes the edges of the skin, where the quills and hairs unite, (which is along the sides,) to be drawn together, by which means the limbs are shut in, and enclosed as if in a purse with sliding strings.

No. 19. *Erinaceus [auritus, Pallas, (nec Geoffroy),* or a closely allied species²⁰. This species is common from Quetta to Candahar. Length from tip of snout to base of tail about a foot; tail an inch and a half. Ears very large and rounded, cinereous; face, inside of ears and chin as far as the base of the ears, very pale cinereous, or nearly white; from thence all the under parts are sooty or rusty-black; head, limbs and under parts, clothed with soft hairs of a sooty black [or fuliginous-brown]; feet darkest; tail black, obtuse and nearly naked; toes five on all the feet; claws whitish. Quills banded with dirty straw colour and black. This is the description of an adult male taken at Candahar. They feed on slugs, and *helices* with which the fields at Candahar are overstocked; they also prey on worms, insects, and

20. The Siberian *E. auritus* is described, in Pennant's Quadrupeds, to have the "*upper jaw long and slender; with very large open ears, naked, brown round the edges, with soft whitish hairs within; tail shorter than that of the European Hedgehog: upper part of the body covered with slender brown spines, encompassed at the base, and near the ends, with a ring of white: the belly and limbs clothed with a most elegant soft white fur.*" The statements here italicized do not apply to the great-eared Afghan Hedgehog, the ears of which measure an inch and a quarter long posteriorly, and seven-eighths of an inch broad; their colour white: the dorsal spines are a little grizzled at the surface, and radiate from the middle of the back, meeting those from the sides, which are disposed irregularly as in the British Hedgehog.

The muzzle is rather short and broad: the dentition presenting three subequal pre-molars above, anterior to the scissor-tooth; the first being largest, and the third scarcely inferior to the second, but having a basal inner lobe; the small hindmost molar is also well developed, and is placed much less obliquely than in the European Hedgehog. Should it prove new, I propose that it be termed *E. megalotis*.

lizards. They hide during the day in holes, and come out in the evening to feed. They retire to hybernate in deep holes in the earth in the end of October or beginning of November, according to the season, and remain in a semi-torpid condition till February, when they again appear.²¹

(To be continued.)

*On the Course of the River Nerbudda. By Lieut.-Colonel OUSELEY, Agent G. G. S. W. Frontier; with a coloured Map of the River from Hoshungabad to Jubbulpoor.**

The leading article of No. 151, of the Journal Asiatic Society for 1844, is headed "Note on the Navigation of the River Nerbudda," compiled from information afforded by a number of officers. The map that is given with it, is part of the one that accompanied my report, forwarded to Government, (Lord Wm. Bentinck,) 13th June, 1834.

I find that I have not a copy of that report, and have requested Capt. Spence, the Deputy Commissioner at Hoshungabad, to favor me with one; but from private memoranda, I am enabled to state that the expense would be too great to calculate on an uninterrupted navigation, or admit of such water carriage as would be safe, and profitable. The nature of the rocks, compact basalt, or granite, renders it almost impossible to employ the agency of gunpowder to clear away the obstructions, it would be too slow a process for the extent to be undertaken. Again, supposing the whole distance cleared, including all the greater obstacles near Hindia, Mundhar, Dhardree, the Suhashurdhara Burkherey, Herunphal, &c. the elevation of the country at Hoshungabad being about 14 or 1500 feet above the sea, the rapidity and shallow body of the current would consequently be totally inadequate for boats of any size; and would be followed by the continued cutting away of the earth, and

21. Hedgehogs are found in the very hottest parts of peninsular India, and I have been assured, on good authority, of the existence of a species in the Bengal Soonderbuns. Four species from this country have been named already; but I have great reason to suspect the existence of others, and recommend that all collectors should preserve as many species of these animals, as they may be able to obtain.—*Curr. As. Soc.*

* See Proceedings for February, 1845.

a renewal of obstructions. For the river is too large to be retained for any distance by banks or walls across it, so that if the inclination should here and there be moderate, as from Nursingpoor to Hoshungabad, Hoshungabad to Hindia, at Mundlaiser, &c., the descents would be still more precipitous at other places, between hills and rocks towering above one thousand feet on either side.

The country where these obstacles present themselves is mountainous, so that canals could not be cut from any given point above, so as to lead back into the river to a navigable part below, for the descent to the sea is, as it were, in steps. The possibility of making the river navigable of course exists, but the expense would be such as to prevent any attempt being made by the Government; nor do I think that the outlay could ever be made good. At Hoshungabad, the river is from 700 to 900 yards (and even more) wide; it often in the rains overflows its banks, which are at that place from 50 to 70 feet in height. What command could be hoped for, over such a body of water, running at the rate of six or seven miles an hour, *only*, increasing in size as it flows to the west, where the chief obstacles exist; at Dhardree vast trees are precipitated into the depths below, often coming up shattered into many pieces.

The native Surveyor in speaking of the rocks, said they were iron-stone, alluding merely to their hardness. He mentioned the kindness of the Bheels who attended his party along the river, in carrying some of the sepoy and others taken ill, procuring supplies and game, but seemed to think the river could not be rendered available for navigation. His map was written in Nagree on a large scale, and from that I reduced it, and sent it in the rough, as I had not time from my other duties to do it more carefully. The chief coal discoveries were subsequently made in the tours of the Division that I undertook annually, and disclosed mineral resources that are unbounded.

The coal found at Bénar, in my opinion, must be that used for railway communication; it cokes, as the Welch coal does when piled in heaps of any length, about five or six feet in height, and nine or ten feet base, forming an angle, covering it with dust, and allowing it to burn slowly from end to end. The coal was tried on the Indus Steamer at Bombay, 100 maunds did what 183 of the best Glasgow coal was required

to perform, heating one of the boilers of the steam engine fifteen minutes sooner than the Scotch coal.

The iron found at the same place has already been proved to be of the very best kind. The late Col. Presgrave constructed an iron suspension bridge of similar iron (found at Tendoo Khera on the north bank of the Nerbudda) at Saugor, which is at this present moment in as good order as the day it was made, 10 or 15 years ago. Having such coal, iron, and lime (which abounds), furnaces and founderies should be erected at Bénar, rails made, and the whole of the material supplied for the rail communication of India.

The produce of the richest country in India, the Nerbudda valley, would then find its way into the market; the wheats and white linseed now so much admired, and justly appreciated, would be attainable every where for seed, or consumption, and a country paying about 10 or 15 lakhs of land revenue (I do not include more than the Nerbudda valley and Baitool) would give triple that amount without being felt. So long as the present inefficient mode of carrying away the produce of an extensive agricultural district remains in use, the value of the land must be low; but on the abandonment of Bunjarra bullock-carriage and the adoption of rail lines, the prices of wheat, boot gram, linseed, &c., would more than triple themselves. It often happens that wheat sells for from 90 to 110 seers (90 Sicca weight) for a rupee; gram, 110 to 120 seers; linseed, 80 to 90 seers for one rupee; all of which grains are of the most superior description, and unequalled in India. Cotton, sugar, &c. are also produced, of the best description.

The part of the map I have now the pleasure to send, completes the course of the River from Jubulpoor to Hoshungabad; I have added the coal and iron sites, and trust that the information may be acceptable.

J. H. OUSELEY,

Agent Govr. Genl. S. W. F.

2nd August, 1845.

A TWELFTH MEMOIR ON THE LAW OF STORMS IN INDIA; *being the Storms of the Andaman Sea and Bay of Bengal, 9th to 14th November, 1844.* By HENRY FIDDINGTON.

The present memoir will scarcely need, at least for readers in India, any introduction; for the intense interest excited by the wrecks, and wonderfully providential escape of the troops and crew, of the *True Briton* and *Runnymede*, must yet be fresh in their minds. For those however in other countries who may honour it with a perusal, I may say that on the 9th November 1844, the barque *Dido* was dismasted in a hurricane in the Andaman sea, *into* which also the transport ships *Briton* from New South Wales, and *Runnymede* from England, both bound to Calcutta, the two together having in European troops and crews nearly 700 souls on board, were then running; and that being caught in it they were partially dismasted, and finally at about one in the morning of the 12th both ships were—wonderful to relate—thrown high and dry on the shore of the small or inner Andamans, the provisions of the one serving most opportunely for the support of the people of the other, and the whole being well able, by the troops, to defend themselves against the savages: They were taken off by assistance obtained from the British settlements on the Tenasserim Coast. I refer to the Summary at the conclusion for details, as to the highly instructive lesson in our science to be drawn from those storms; which in brief words amount to this—that the lives of a whole European Regiment were perilled to the utmost possible extent, short of destruction, by the ships not heaving to for six hours! As far as loss of life can be weighed or counted, the loss of a European Regiment in India would be equal to the loss of an average, or a first-rate, battle!

Abridged Log of the Steamer ROYAL SOVEREIGN, Capt. MARSHALL, from Penang to Calcutta.

On 9th November, 1844.—P.M. Light breeze SSE and clear weather. 8 P.M. abreast of Seyer Island, altered course to North. Midnight "fine steady breeze with drizzling rain."

10th November.—A.M. At 1 breeze increasing; at 2 heavy gale WNW. Ship hove to under balanced main-trysail. 4 A.M. gale in-

creasing, ship hove on her beam ends, stowed the trysail; 10 squally with heavy rain; 11 A.M. began to clear up. Noon, strong gale and clear weather. Distance run from noon 9th, 138 miles. At noon centre of St. Matthew's Island East $\frac{1}{2}$ N., distant 20 miles, Lat. Obs. $9^{\circ} 50' N.$

P.M. Stopped steaming for repairs; course having been always NNW. At 2.30 heavy gale NNW.; by 8, wind SSW. hard gale and heavy squalls; all hands at the pumps. At midnight gale moderating, and the wind shifting to the SE. made all sail to get off the lee shore, course NNW.

11th November.—2 A.M. Squally with heavy rain. 4 A.M. clearing up, and fine breeze from the SE. noon Lat. Obs. $11^{\circ} 6' N.$ centre of Clara Island EbN. $\frac{1}{2}$ N. distant 28 miles. Distance run from noon 10th to noon 11th, 58 miles.

*Abridged Log of the Dutch Barque FATTEL HAIR, Capt. ———
from Batavia bound to Calcutta, reduced to civil time.*

7th November, 1844.—Lat. noon $8^{\circ} 48' N.$, Long. $96^{\circ} 48' E.$ P.M. to midnight, light and variable winds from the NNE. and NE.

8th November.—AM. to noon, the same; wind NNE. and with light squalls. Noon Lat. $10^{\circ} 3' N.$ Long. $95^{\circ} 56' E.$ P.M. wind NbE. squally. By 7 P.M. ship had stood $14\frac{1}{2}'$ to the EbN. and had then the wind NW. with squalls, increasing to midnight, up to which time she stood $16'$ to the NNE.

9th November.—To 8 A.M. wind marked NW. and squally, 9 A.M. wind NNW. Noon increasing, preparing for bad weather. Lat. $10^{\circ} 50' N.$ Long. $96^{\circ} 25'.$ Barometer marked as “still standing at 29.6. P.M.* blowing fresh, increasing squalls and sea rising fast. Wind WNW. At 2 wind shifted to SW., kept away under the main top-sail and ran to 6 P.M. about 32 miles.” Sea rising fast. At 6 P.M. wind SSW. increasing to a heavy gale, hove to. At midnight blowing furiously.

10th November.—A.M. Increasing, boats blown and washed away. Wind SE. and to noon the same; “wind coming round from East to

* From this time the Log is in the form of a narrative.

due North. Barometer as before. P.M. wind increasing, Barometer beginning to fall at 1 o'clock." At 6 P.M. wind NNE. Barometer down to 28.5. At 9h. Barometer beginning to rise fast, a heavy squall, wind NW. At 9-30 gale beginning to moderate. Midnight, gale had moderated considerably.

11th November.—A.M. Wind SW. coming gradually round to the Southward, squalls continuing, but on the whole moderating. At 11 A.M. Barometer "up to fair again (about 30.00 in the usual Barometers), as usual." Noon, sea going down, Lat. 13° 6' N. "N. B. this gale went round from North to SW. SE., East and North again twice."* P.M. wind SSE. run from midnight to noon being 27 miles North.

On the two following days wind moderate from the SSE.

*Abridged Log of the Schooner CLOWN, Capt. J. TALBERT, from
Penang towards Calcutta, reduced to civil time.*

8th November, 1844.—2 A.M. a heavy squall from the North, and at noon squally appearances with winds variable from the North. Noon Lat. account 9° 58' N. Long. 96° 26' E. P.M. winds N. Easterly and Northerly with a heavy rising sea.

9th November.—Winds variable from the Northward and towards noon veering to the Westward. Noon "fresh gales with a tremendous heavy sea," Lat. account 10° 41' N. Long. 95° 56' E. P.M. wind westerly, hauling to the South with heavy sea throughout. 10 P.M. hove to; when up West and off NW. Wind therefore about SSW.

10th November.—A.M. increasing gale. 9 A.M. wind marked SSW. Noon strong gales, no position given. P.M. Strong gales S Westerly to midnight, when more moderate.†

11th November.—A.M. Wind Southerly, daylight out all reefs and fine. Noon, no position given. Wind S. Easterly; a 6-knot breeze. P.M. fine weather, wind S. Easterly 6 knots.

12th November.—Daylight saw Narcondam, bearing NbW. Noon Narcondam SWbS. 6 or 7 leagues. Winds SE. and ESE. 6 and 7 knots throughout.

* The paragraphs marked by commas, are literal extracts.

† Vessel drifting to the N. Eastward, and storm moving to the Westward ?

13th November.—Winds steady S. Easterly throughout. Noon Lat. account $15^{\circ} 27' N.$, Long. $92^{\circ} 37' E.$ Noon and P.M. squally with a heavy sea, 6 to 8 knots.

14th Nov.—S. Easterly breeze of 7 and 8 knots throughout. Noon Lat. account $17^{\circ} 53' N.$, Long. $91^{\circ} 00' E.$ P.M. to midnight wind N. Easterly.

15th Nov.—1 A.M. Lat. by star Rigel $19^{\circ} 12'$ Wind NNE. Noon Lat. $19^{\circ} 33'$, Long. $89^{\circ} 45' E.$

Extract from the private Journal of Commander VYNER, R. N. late of H. M. S. WOLF, passenger in the Brig Dido of Calcutta, from the Straits of Malacca to the Sandheads.

6th November, 1844.—A.M. Fine weather, light winds from the Northward. P.M. towards midnight, fresh breezes and rainy.

7th November.—4 A.M. More moderate; noon, light winds from the Northward and Eastward, sunset fresh breezes and hazy.

8th November.—2 A.M. Squalls, with strong breezes and drizzling rain, which lasted throughout the day.

9th November.—A.M. Light breezes from the NNE., at 4 squally dirty weather, barometer going down fast, commenced reducing sail; at 8 wind increasing furled the courses, and close-reefed the top-sails, split the main top-sail in a squall, down royal yards; 9 a heavy squall, put before the wind, and unbent main top-sail; it was now blowing very hard, and a heavy turbulent sea running; at 9-20 the mainmast went close under the hounds, and fell forward in an oblique direction over the larboard bow, gale still increasing; at 9-30 the fore-topmast went by the board, and fell over the larboard bow. The ship was now in so lumbered a state from the wreck, that it was difficult to move without being hurt by some or other of the geer fetching way. From 9 to 11 the hurricane was at its height, and blew the whole time with unceasing violence; at 11 it suddenly fell calm, and in about $\frac{3}{4}$ of an hour the gale again commenced from SW. and W. and blew as hard as before. Lat. at noon $11^{\circ} 6' N.$, Long. $96^{\circ} 12' E.$, at 1 P.M. the weather began to assume a better appearance; but the sea was running immensely high.

The wind at 3 P.M. began to veer to the Southward, and blew moderately. The Barometer did not fall below $29^{\circ} 30'$ during the hurricane.

The wind from SE. continued until the 15th, when it ended in a very heavy gale, drawing round to SW. the violence of which lasted from 10 A.M. until 3-30 P.M. and here ended our disasters.

ARTHUR VYNER.

Abridged Log of the Brig Dido, Capt. SAUNDERS, from Penang to Calcutta, civil time.

The *Dido* left Penang on the 4th November, 1844, and had variable, baffling, light winds from the North and between NE. and NW. so that by the 7th, at 8 A.M. she had the great Seyer Island bearing ENE., distance 24 miles, which would place her at the time in Lat. $8^{\circ} 30' N.$, Long. $97^{\circ} 23' E.$

On the 8th November.—The same winds and weather A.M. At noon, no observation; P.M. light winds from NNE. to NW. with drizzling rain.

9th November.—Winds from NW., NNW., and at 8 A.M. North, with very dirty appearance. At 9, hard gales, obliging her to run to the South, the wind not marked but, as by Commander Vyner's note, NE. At 10, carried away mainmast head, and by noon when Lat. by account is $11^{\circ} 6' N.$, Long. $96^{\circ} 12' E.$ nothing but foremast and bowsprit standing. Shortly afterwards the wind is marked South.

10th November.—A.M. hard gales South to SSE. noon gale still keeping up and drawing to the SE. P.M. wind SE. 8 P.M. E. terrific gales and increasing, ship labouring dangerously, losing boats &c. &c., and in distress. No position given at noon; 10 P.M. gale decreasing a little; midnight wind SE.

11th November.—Gale moderating, wind SE. throughout, no observation. Clearing the wreck.

12th November.—A.M. moderate SE. breezes, at noon Lat. $13^{\circ} 39' N.$ wind marked S. Easterly throughout.

13th November.—Wind marked SE. throughout, light breezes and fine. Noon Narcondam SbW. $30'$, Lat. $14^{\circ} 04'$.

14th November.—Wind SE., 5 and 6-knot breeze throughout. Noon Lat. $15^{\circ} 07'$; P.M. squally and heavy rain.

15th November.—A.M. wind SE. fresh breezes with heavy rain and cross confused sea. 8 A.M. to noon, wind marked South to SSW. and SW. 8 fresh gale and dirty weather. 1 to 8 P.M. wind marked West to NW. and West; at 8 gale increasing; hove to at 4 P.M.; 8 P.M. wind falling light, and sea with it; at midnight fine.

16th November.—Wind marked W. 4. A.M., when NW. weather marked fine; noon Lat. $17^{\circ} 50'$ N. from which to midnight 19th calms; noon 19th Lat. $18^{\circ} 58'$, Long. $89^{\circ} 50'$ E.

Extract from the Log and Chart of the Ship BRITON, Capt. HALL, from Sydney to Calcutta, with Troops on board, reduced to civil time.

Capt. Hall having favoured me both with his log-book and chart, I note here the position laid down upon the chart, as presenting a summary view of her track into the storm, and her drift in it according to Capt. Hall's estimate at the time.

			Lat. N.	Long. E.
8th November.	..	..	$8^{\circ} 25'$	$96^{\circ} 55'$
9th	..	Noon,	$9^{\circ} 10'$	$96^{\circ} 30'$
..	..	6 P. M.	$9^{\circ} 43'$	$96^{\circ} 12'$
10th	..	..	$11^{\circ} 00'$	$95^{\circ} 12'$
11th	..	..	$11^{\circ} 33'$	$94^{\circ} 55'$
12th	..	Would have been in,	$12^{\circ} 04'$	$93^{\circ} 56'$

On the 8th November.—The *Briton* was at noon in Lat. $8^{\circ} 25'$ N. Long. $96^{\circ} 55'$ E. or about abreast of the Seyer Islands, with very light baffling winds from the N. Eastward: and cloudy weather, which to midnight freshened gradually to a 4-knot breeze. Wind at 1 P.M. marked North, and for the rest of the Log, "variable from SW. to NW.

9th November.—1 A.M. course is marked WbN. to noon, the wind being from the NbW.; at 3-30, strong breezes. At noon, light and fine, Lat. Obs. $9^{\circ} 10'$ N., Long. $96^{\circ} 30'$ E. P.M. wind freshening fast from SW. and becoming SSW. at midnight, an 8-knot breeze; run $83'$ NWbN. from noon. At 6 P.M. dark gloomy weather,

and Simpiesometer 29.30. At midnight strong gale and squally, making preparations for bad weather.

10th November.—4 A.M. Simpiesometer 29.20. To 6 A.M. ran 38' NWbN. when "blowing terrifically with awful squalls," hove to with head to the NNW. 9 A.M. gale still increasing, took in the main top-sail and lashed a tarpaulin in the mizen rigging; 9-30 A.M. top-masts blown over the side, and all the sails from the yards. Simpiesometer fell from 4 A.M. when at 29.20, to 28.10. At noon gale lulled off with showers of rain, and dark gloomy weather. Lat. by account $11^{\circ} 1' N.$, Long. $95^{\circ} 12' E.$ Simpiesometer not rising. P.M. ship lying to with head to the WN. Westward, the gale having again come on from the SW. at 0.30 P.M., and blowing with more violence than ever. 2 P.M. terrific hurricane, boats blown to pieces. In the log, wind marked "variable from NE. to ESE.," at 11 P.M. head "up North off N.W." Midnight hurricane still increasing.

11th November.—A.M. Head as before to noon, the same wind from 1.30 A.M. P.M. terrific hurricane. 2 P.M. saw a Barque about $\frac{1}{2}$ of a mile to the Eastward with only her lower main and mizen masts standing.*

At 10 P.M. hurricane lulled off with an awful swell, and dark gloomy weather. Simpiesometer at 27.2. At 10-30 P.M. wind veered round to the NE. blowing with more violence than before, and starting the front of the poop. Throughout this sea log (from noon) ship is marked "Heading from SE. to North," and "Wind blowing all round the compass."

Fearful of the poop being blown away altogether, took the chronometers, sextants, charts, &c. below. Midnight hurricane still blowing terrifically.

12th November.—1h. 15m. A.M. struck, and at daylight the ship was found high and dry in a mangrove swamp; the *Runnymede* being close to them. Their Lat. was $12^{\circ} 2' N.$, Long. $93^{\circ} 12' 40'' E.$ They were taken from the Islands by ships sent from Moulmein.

After the ship was on shore the remainder of the gale was from ENE., at which point it fell to fine weather. Capt. Hall estimates the rise of the sea, (the storm wave) on the shore as at least thirty feet! He, farther, does not estimate the ship's *apparent* average drift (such

* This was the *Runnymede*.

as seamen usually allow for in a gale) at more than four miles per hour, having once hove the log to ascertain it.

Abstracts of the Log and Chart of the Ship RUNNYMEDE, Captain DOUTTY, from England to Calcutta, with Troops on board, reduced to civil time.

As with the Briton's Log, I have thought it also best here to set down the Latitudes and Longitudes from the chart at first.

				Lat. N.		Long. E.
7th November.	..	..	..	8° 36'	..	96° 51'
8th	„	..	..	9° 32'	..	96° 35'
9th	„	..	..	9° 52'	..	96° 27'
10th	„	..	..	11° 6'	..	96° 0'

Friday, 8th November.—Heavy squalls with unsettled weather nearly through the whole 24 hours; winds variable NE. and N. Westerly; Lat. noon 9° 32' N., 96° 35' E. At 7 A.M. more moderate, sun obscure.

Saturday, 9th November.—Winds variable, at 5-30 wind NNW. squally, in 2nd reefs of the topsails; at 9-30 A.M. wind backing to the Westward, tacked to the Northward. Noon, sun obscure, Lat. 9° 52' N., Long. 96° 27' E. wind WSW. strong breeze; rainy and squally; P.M. increasing, making preparations for bad weather.

Sunday, 10th November.—Barometer falling, strong gale WSW. with heavy squalls; at 5 A.M. in courses and close-reefed the topsails. At 6 A.M. wind SW. blowing very heavily, in fore topsail and brought ship to the wind under close reefed main topsail and main trysail.

Noon no observation, Lat. by account 11° 6' N., Long. 96° 0' E. Hurricane of wind, Bar. 29.00, and falling. At 1 P.M., ship under main trysail only. At 1-30 P.M. the fore and main top-gallant masts were blown away. Wind South blowing very severely, the main trysail blown to atoms, ship under bare poles, and laying beautifully to the wind, with helm amidships and perfectly tight. The hurricane accompanied with a deluge of rain. At 4 P.M. wind SE. blowing terrifically, hatches all fastened down, starboard quarter boat washed away. At 6-30 P.M. nearly calm, wind backing to the SW. Sea went down. Bar. 28.45, kept ship away NbE. and got the top sails re-secured, portions of them having blown adrift. At 8 P.M. Wind SW. hollow

gusts; brought ship to wind on larboard tack. At 8-15 hurricane as heavy as before. At 8-30 the larboard quarter boat was torn from the davits and blown across the poop, carrying away the binnacle, and crushing the hen-coops on its passage. At 9 p.m. wind if possible increasing, the foremast broke into three pieces carrying away with it the jibboom, main and mizen top-masts, starboard cathead, and main yard, the main and mizen masts alone standing. At 10 p.m. the wind and rain so severe that the men could not hold on the poop, bailing the water from between decks which is forced down the hatches, but the ship is quite tight, and proving herself to be a fine sea boat. The pumps attended to, drawing out the water forced down hatches, mast coats, and top-sides forwards.

Monday, 11th November.—Hurricane equally severe; wind SE. Bar. 28.0; the gusts so terrific mixed with drift and rain, that no one could stand on deck; advantage was therefore taken of the lulls to drain the ship out and clear the wreck. The starboard bower anchor hanging only by the shank painter and the stock (iron) working into the ship's side, the chain was unshackled and the anchor cut away. Noon Lat. account $11^{\circ} 6' N.$, Long. $95^{\circ} 20' E.$ No observations since the 7th. Bar. apparently rose a little. Hurricane equally severe in the gusts, the ship perfectly unmanageable from her crippled state, but riding like a sea bird over a confused sea running apparently from every point of the compass. A large Barque with loss of top-masts and main yard drifted ahead of us, and a Brig was seen to leeward totally dismasted. At 4 p.m. Bar. fell to 27.70, and Cummin's mineral Simplesometer left the index tube. Hurricane blowing terrifically, the front of the poop to leeward, cabin door and sky-lights torn away, and expecting every moment the poop to be torn off her. *The severity of the wind is beyond description, there is nothing to compare it to, for, unless present, no one could conceive the destructive power and weight of wind crushing every thing before it as if it were a metallic body.** At 1 p.m. no abatement, every one, sailor and soldier, doing all in their power to keep the ship free of water, could not stand at the pumps; the water being principally in the 'tween decks it was bailed out by the soldiers as much as possible.

Tuesday, 12th November.—Midnight, hurricane equally severe, the

* This is a very remarkable passage, which I have put in italics, as conveying an excellent idea of what the force of these terrific hurricanes is.

gusts most awful, and rudder gone. At 1-30 A.M. felt the ship strike, and considered the destruction of our lives, as well as ship, sealed; but it pleased Almighty God to decree otherwise, for although the ship filled up to the lower beams with water, she was thrown so high on the reef that the water became smooth, and the bilge pieces keeping her upright, she lay comparatively quiet. Not knowing our position, the ship being bilged, and fearful of her beating over the reef into deep water let go the larboard bower anchor and found the water leaving her. All hands fell asleep.

Day-break, hurricane breaking, much rain, wind ESE. Bar. rising rapidly until it stood at 29.45; we then, thank God, saw the loom of the shore to leeward, the ship being nearly dry abaft; on its clearing away we saw inside of us, up among the trees, a large barque with troops on board; one officer and twelve men were sent over the stern to communicate with her. At 7 A.M. the tide now rising, orders were given for the men to land at next low water, and if possible to get something cooked, as no fires could be kept in during the hurricane, the crew and troops merely having biscuit and a glass of spirits during the time it lasted. 3-30 P.M. the tide having fallen sufficiently to wade on shore, ensign Daberny returned on board, and stated the vessel in shore of us to be the "*Briton*," from Sydney, with three hundred and eleven men, thirty-four women, and fifty-one children, of H. M. 80th Regt. under the command of Major Bunbury, with a crew of thirty-six men, bound for Calcutta, and short of every thing.

N. B.—Captain Doutty informs me that the Thermometer at the lowest of the Barometer was at 84°, and that he considers the average drift of the vessel not to have exceeded three miles per hour. On shore nearly all the trees had fallen to the S. Westward, shewing that there the gale had been about NE. at its greatest height.

Ships BLUNDELL and APPOLLINE. Between 9th and 18th November.

The *Blundell* was between the parallels of 2° and 12° North, and the meridians of 90° 32' and 92° East, with nothing but calms and light airs.

Between the 9th and 19th.—The *Appolline* was in from Lat. 4° 48' to Lat. 15° 1' with light winds and fine weather. On the 12th only

in Lat. $8^{\circ} 21'$ N. the Bar. fell from 29.2 to 29.00. Long. on that day not obtained.

Abstract translated from Log of the French Ship LA PETITE NANCY, Captain DUFOURG, from Bourdeaux to Calcutta, reduced to civil time.

On the 10th November, 1844.—*La Petite Nancy* was in Lat. $8^{\circ} 2'$ N.; Long. by Chro. East of Paris $89^{\circ} 52'$ or of Greenwich $92^{\circ} 12'$ Bar. F. 28.00 or 29.85 English* Wind West, course NNE. $4'$ per hour; slight squalls and rain at times. P.M. fine, a slight swell from the North; at 9 P.M. wind SW. to SSW. to midnight.

11th November.—A.M. cloudy, and a swell from NE. and to noon variable winds SSW. to West and fine; ship running 7 to 9 knots to the NbW. At noon a heavy squall Lat. $9^{\circ} 53'$ N., Long. P. $89^{\circ} 49'$ G. $92^{\circ} 09'$ Bar. F. 27.10 or 28.29 E. P.M. to midnight run $77'$ to the NNWrd.; winds West to SW. squally, and wind rising and falling (*brise inégale et variable*) at 6 sharp lightning with thunder; midnight finer weather and strong head sea.

12th November.—A.M. to noon run 66 miles to NbW. and NNW. Wind WSW. to SSW. heavy sea. 9 A.M. heavy squall; noon Lat. $12^{\circ} 25\frac{1}{2}'$, Long. $88^{\circ} 55'$ P. or $91^{\circ} 15'$ E. Gr., Bar. 27.8 F. or 29.64 E. wind SSW. P.M. cloudy, wind WNW. to WSW. to 8 P.M. and SW. to SSW. to midnight. P.M. ship's run $41'$ North a little Easterly; at midnight finer weather, carrying a top-mast studding sail.

13th November.—A.M. to noon run $102'$ to the NNW. Winds from WSW. to SSW. 9 A.M. heavy squalls and head sea; noon Lat. account $14^{\circ} 25\frac{1}{2}'$ Long. $88^{\circ} 8\frac{1}{2}'$ P. $90^{\circ} 28\frac{1}{2}'$ G. Bar. 27.8 F.; 29.63 E. P.M. Run $107\frac{1}{2}'$ North a little Westerly. Winds SSW. to SW. and at midnight South. 9 P.M. sharp lightning, high irregular sea.

14th November.—A.M. to noon, made $104\frac{1}{2}'$, North to NNW. up to 10 A.M. when she broached to; winds to 4 A.M. South to SW., from 4 to 8 SSW. to South; 8 to 12 South, SSE. and a shift to SW. From 5 A.M. blowing heavily, preparing for bad weather. 10 A.M. Bar. 27.6. F. 29.41 E.; at $\frac{1}{2}$ past 10 wind *shifted*† to SW. heavy gale and sea, ship

* I give the French Longitudes and Bar. heights with the reductions, to avoid oversights. The correction used is $+2^{\circ} 20'$ to bring the Long. to the meridian of Greenwich, and for the proportional scales of the Bars. 1000 E. : 1066 Fr.

† The word is *sauté*, which is our "shifted."

broached to, (the rudder head it was found afterwards had split) and was laid on her beam-ends, mainsail main top-sail, boats, &c., blown or being swept away, the sea being up to the hatchways. At 10.45 hurricane increasing, and vessel always on her beam-ends, cut away the mizen-mast. Bar. falling to 26.7 F. 28.46 E. At 11 A.M. cut away top-masts, when the ship righted a little; Bar. having been at 10 A.M. 27.6 F. 29.41 E.; at 10h. 40m. 27.00 F. 28.78 E.; and at 10h. 50m. 26.7 F. 28.46 E. (a fall of nearly an inch in two hours! and this note is from Captain Dufourg's private memorandum), Lat. by account at noon was $15^{\circ} 47' N.$, Long. $88^{\circ} 12' P.$ $90^{\circ} 32' G.$ At 3 P.M. the wind shifted in a heavy gust with torrents of rain to the SE. with the same violence,* and being then to starboard, righted the vessel completely; but she did not lie over to port, which confirmed the opinion of the Captain and officers that the cargo had shifted.

At half-past 3 the wind suddenly fell, but the Barometer always remaining at 26.7 F. (28.46 E.) a renewal of the storm was expected. At 5 P.M. the hurricane began again more violent than before, from the SW. and continued till 9 P.M. the ship always heeling to starboard. From 9 P.M. it was moderating.

15th November.—P.M. Weather moderating fast; at day-light saving and clearing the wreck, Lat. noon by account $16^{\circ} 40' N.$ Long. P. $88^{\circ} 37' E.$, G. 90.57 E.; Bar. 27.00 F. 28.78 E. P.M. moderating to light airs SW. and S. and heavy sea continuing.

16th November.—Daylight calm with a heavy sea, saving and clearing wreck. Noon Lat. Obs. $17^{\circ} 00' N.$, Long. Obs. $88^{\circ} 49' E.$ P. $91^{\circ} 09' E.$ Bar. 27.8 F. 29.63 E. to midnight calm.

17th November.—Calms which continued to 5 A.M. on the 19th November. Noon Lat. Obs. $17^{\circ} 6' N.$ Lon. Obs. $88^{\circ} 58' F.$ $91^{\circ} 18' G.$ P.M. Bar. 28.00 E. or 29.85 E.

The ship made no water, and arrived safely at the Pilot station on the 25th. November.

I now give a tabular view of the positions of the ships on different days beginning with the 9th, as on the 8th we may say that there was no bad weather, the *Clown* having it only a little squally, all the others with light baffling winds and slight squalls from the North.

* The ship having drifted to the NE. and the hurricane passed on to the WNWestward.

Tabular View of the Winds and Weather in the Andaman Sea and Bay of Bengal 9th to 11th of November, 1844.

Date.	Name of Place or Ship.	Wind and Weather.	Lat.	Long.	Barometer.	Simp.	Ther.	Remarks.
Noon. 9 Nov.	Steamer Royal Sovereign,	Fine SSE. Abreast of Seyer Islands,	0 1	0 1			0	
	Barque Fattel Hair,	WNW. increasing gale, 2 P.M. shifted to SW. ..	10 50	96 25	29.6	..	..	6 P.M. hove to. Wind SSW, heavy gale; midnight hurricane.
	Schooner Clown, ..	Variable, and at noon veering to westward, fresh gale, and tremendous sea.	10 41	95 56	..	..	..	P.M. Wind westerly, and hauling to the south. Vessel hove to at 10 P.M. Wind about SSW.
	Brig Dido,	A.M. Light breezes NNE. and NNW. dirty; 9 A.M. hard gales NE..... ..	11 6	96 12	..	..	..	By 11 A.M. dismasted, 11 A.M. calm, and at noon hurricane from SW.
	Briton,	Light and fine weather, 6 P.M.	9 10 9 43	96 30 96 12	..	6 P.M. 29.30	..	P.M. Freshening fast from SW. and SSW. at midnight.
	Runnymede, ..	WSW. Rainy and squally,	9 52	96 27	..	..	..	Making preparations for bad weather.
Noon. 10 Nov.	Brig Dido,	Hard gale SEBS. P.M. SE. terrific gale, .. ..	..	..	..	..	..	10 P.M. gale decreasing; midnight, wind NE.
	Briton,	Noon SW. gale lulled off, P.M. renewed,	11 1	95 12	..	29.20 to 28.10	..	1 A.M. hove to. P.M. hurricane NE. to ESE, midnight increasing.

Date.	Name of Place or Ship.	Wind and Weather.	Lat. N.	Long. E.	Barometer.	Simp.	Ther.	Remarks.
Noon. 10 Nov.	Runnymede, ..	Hurricane SW. At 2.30 S. 4 P.M. SE. 6.30 nearly calm, 8-15 hurricane SW.	0	0	29.00 28.43 6 P.M.	..	0	Ship hove to.
	La Petite Nancy, ..	West slight squalls and rain, veering to SW. at midnight,	11 6	96 00	29 85	..	..
	Steamer Royal Sovereign, ..	2 to 10 A.M. heavy gale WNW. at 11 clearing up, noon strong gale, 2-30 P.M. heavy gale NNW. by 8 SSW.	8 2	92 12				
	Barque Fattel Hair,	A.M. SE. Noon, North; 6 P.M. NNW. 9 NW. mid- night moderating, ..	9 50	..	..	..	..	Noon; centre St. Matthew's Is- land E. $\frac{1}{3}$ N.
	Schooner Clown, ..	9 A.M. SSW. increasing gales; P.M. SWesterly, at midnight more moderate,	..	..	6 P.M. 28.5	..	..	9 P.M. Barometer beginning to rise.
Noon. 11 Nov.	Dido, ..	SE. gale throughout, ..	..	..		10 P.M. 27.2	..	
	Briton, ..	Terrific hurricane, ..	..	..	..	..	..	10 P.M. another lull, and renewed again from the N.E. 2 P.M. saw the Runnymede. At 1.15 A.M. 12th struck.
	Runnymede, ..	Hurricane SE. ..	11 6	95 20	28.0 27.70	..	84	At 2 P.M. saw Briton. At 1.30 A.M. of 12th struck.
	La Petite Nancy,* ..	West to SW. rising and fall- ing,	9 53	92 09	28.89	..	..	At midnight finer, but strong head sea.

* For the dismasting of this ship on the 14th, and the connection between her storm and the *Dido's* second bad weather, see the Summary.

Date.	Name of Place or Ship.	Wind and Weather.	Lat.	Long.	Barometer.	Simp.	Ther.	Remarks.
Noon. 11 Nov.	Steamer Royal Sovereign, ..	Fine weather, and breeze from SE. ..	0 ' 11 6	0 ' ..	..	..	..	Centre Clara Island EbN. $\frac{1}{2}$ N.
	Fattel Hair, ..	Noon. Wind Southerly, and weather becoming fair, ..	13 6	..	..	..	..	11 A.M. Barometer at "fair."
	Schooner Clown, ..	Noon. Fine, and wind S. Easterly and 6-knot breeze, ..						

SUMMARY.

I have already remarked that on the 8th of November the weather was fine for all the ships, none of which were to the North of Lat. 10° , and we find on the 9th that the *Dido* was dismasted about the centre of the hurricane, at 11 A.M. on that day, and by noon the calm centre had passed her, and she was again in a hurricane at SW. This vessel's position therefore, and we have it most accurately fixed, (having fortunately in Commander Vyner, R. N. who was passenger on board of her, an independent observer, who would make every allowance in his notes for what might escape the Captain and officers,) gives us the place of the centre of the storm on that day as being a little to the N. West of her. The storm circle at this time must have been of extremely small extent, for it had but just reached the *Clown*, which vessel was only twenty miles distant from the *Dido*, which would make the circle less than 40 miles in diameter; but the *Clown* had the usual warning of a rapidly veering wind, and a tremendous heavy sea, and the *tornado*, for so we might almost call it for its size, was fortunately moving rapidly on, so that by her heaving to at night with the SSW. gale she fortunately escaped running into the worst part of the tempest. I have thus given the circle for this day a diameter of sixty miles only, which will just include the *Clown*. The hurricane for this day indeed remarkably resembles that of the *Cashmere Merchant*, described in my Second Memoir, Journal Asiatic Society, Vol. IX, p. 433, which also occurred near the Preparaïs, and some of those which (see Tenth Memoir, Journal Asiatic Society, Vol. XIII, page 113.) also arise off the coast of Ceylon. For the centre of the storm circle on the 10th, we have the estimated position of the *Briton*, which ship after running up 121 miles to the NWbN. the exact course upon which she should have CHASED the hurricane if she had meant to do so, found herself obliged, at 6 A.M. to heave to close to the centre, into which she had drifted at noon; having sunk her Simpiesometer from 29.20 at 4 A.M. to 28.30 at 6, her estimated position at noon being $11^{\circ} 1' N. 95^{\circ} 12' E.$ and the lull occurring just at this time. The *Runnymede*, which vessel had also been tempted by the treacherous fair wind, and run up 80 miles to the NWbN. though with a falling Barometer, was about fifty miles to the

Eastward of her, and had it also blowing a hurricane from about South, judging from the log abstract, in which it is made to be SW. at 1. A.M. or after midnight up to Noon, and South at 2h. 30' P.M. The *Dido* whose exact position this day I could not obtain, has a hurricane at SE. being in the NE. quadrant. The hurricane had thus no doubt extended on this day from a circle of 60 miles to one of 130, and apparently was still doing so, for the *Fattel Hair*, farther to the Eastward than the *Runnymede*, seems to have ran up skirting the SE. quadrant of the storm and to have had the true storm wind at SW. when it "shifted at 2 P.M." to that point. The *Royal Sovereign*, close in with the land, appears to have also had a separate small storm veering with her in a few hours, but not of any very great consequence, or at all connected with the *Briton's* and *Runnymede's*; though, as I shall subsequently shew, it may probably have been so with the remarkable double veering of the *Fattel Hair's* winds. On the 11th we have the above two ships always lying to and drifting, as well as they could estimate in the hurricane, to the points marked on the charts, which are about forty miles NNW. and SSE. of each other, but there is no doubt that the ships saw each other at 2 P.M. on this day; the *Runnymede* also saw a brig, but this was not the *Dido*, which vessel had her foremast standing, and was not at this time in the heart of the hurricane.* We shall also find that the two ships *Briton* and *Runnymede* struck just after midnight of the 11th-12th, (or between 1 and 2 in the morning of the 12th) so that they must have been now much farther to the Eastward than they supposed themselves. We have no fixed positions of any other ships also from which to guide us as to the extent of the hurricane circle on this day, and in short our only *datum* is that both ships having the wind to the Eastward, *i. e.* the *Briton* between NE. and ESE. and the *Runnymede* about SE., both must have finally drifted over to the Northern quadrants of the hurricane, though always close to its centre.

We must then therefore consider that (throwing away the odd hour or two after midnight of the 11th-12th) the hurricane travelled, and carried the ships with it from the place of our centre on the 10th, to

* Probably one of the native coasting craft which run across the Bay to the ports of the Straits.

near that at which the ships were wrecked on the inner Andamans as marked; which is a distance of about 140 miles in 36 hours, or from noon of 10th to midnight 11th-12th, and we can only estimate this also on a direct line. Hence by noon of the 11th then, or in 24 hours, it would then have travelled two-thirds of this distance, at which point I have placed its centre for the 11th, which the reader will observe is wholly irrespective of the supposed positions of the ships as marked on their charts. I have made a dotted line to shew what *may* have been their drift, if we have, as I presume, approached the true place of the centre of the storm at noon on the 11th.

The *Petite Nancy*, which on this day was opposite to the opening between the Little Andaman and Nicobars, appears, though at 150 miles from the centre, as we have laid it down, to have felt some of the effects of the storm, for we observe that with a NE. sea and squally weather, her Barometer had fallen nearly an inch! (0.96) in the 24 hours from the 10th. And that she had the rising and falling wind which I have so often pointed out as indicating the approach or vicinity of a storm. I defer the consideration of the storm which dismasted her to its proper place in the order of time. Between 1 and 2 A.M. on the 12th, the *Runnymede* and *Briton* were both thrown high and dry on shore on the inner Andamans, by a gale between ENE. and East; and Captain Doutty of the *Runnymede* informs me that most of the trees had fallen to the S. Westward, showing clearly that the centre of the Hurricane had passed to the South of this spot. The storm wave I shall presently consider; but return now to the *Royal Sovereign* on the opposite Coast.

We find that within a short distance of the Islands fronting the coast, on the 10th November, the *Royal Sovereign* had at 2 A.M. a heavy gale at WNW. when the vessel was hove to, and at 4 A.M. she was on her beam ends. At 11 it began to clear up, and noon was but a strong gale and clear weather.

Now from 2 A.M. to noon are 10 hours, and in this time a Steamer in such weather, when hove to, might drift at least fifteen or twenty miles to leeward, though keeping to with her steam; and the wind being to the Northward of West she might drift out of the edge of the storm circle, or as she seems afterwards to have steamed on to the NNW. have again ran into the vortex on its western side if it was one;

so that the gale was renewed with her at NNW. veering, as she was close to the centre,* by 8 P.M. to SSW. and moderating at midnight of this day, when she was about in Lat. $10^{\circ} 20'$ N. and at noon on the 11th it was fine.

We see, first, by the chart that on the 9th, the *Sovereign* was only abreast of the *Seyers* in $8^{\circ} 30'$ N., and on the 10th the whole of the ships, except the *Fattel Hair*, were at nearly two degrees distant from her; the *Runnymede*, the nearest of them, being at 110 miles off, and both the *Runnymede* and the *Briton* close to the centre of their storms, with which therefore the *Royal Sovereign's* has no sort of connection; for if it had, it must have been a steady gale from WSW.

It was then an independent (and perhaps an imperfectly formed) vortex, and we have now to see whether it had any connection with the double veering of the *Fattel Hair's* storm.

This vessel, we have seen, hove to at 6 P.M. on the 9th, being then about in Lat. $11^{\circ} 20'$ N., Long. $96^{\circ} 37'$ E.† with a gale at SSW., and this, by the way, *proves* that up to that time the centre of the principal, or great storm, had really travelled about West, as we formerly deduced. The storm was also probably expanding at this time.

The *Fattel Hair*, gradually drifted up with the SSW. gale and sea, so as at 1 A.M. or in 7 hours, when her drift might have been about twenty-five miles North, to have the wind SE. and at noon on the 10th the wind was "coming round from East to due North!" with her so that, as she could not be now near the centre of the principal (*Briton Dido* and *Runnymede's* Hurricane,) she had been overtaken by another one, or another one had *formed* with her, for we can easily conceive how a S. Easterly gale may by the effect of a new vortex come round, as is here described. Her position on this day at noon is not given, but I take it to have been—as she must have drifted to the NW. West, and even WSW. with the winds given—about Lat. $12^{\circ} 03'$ N. Long. $96^{\circ} 19'$ E. and as she had the wind North or Northerly at noon, she was moreover now to the Westward of the centre

* Or it may be that it was only just *forming*, and interrupted on one side by the neighbouring land? The log extract sent me is not very clearly detailed.

† This is deduced from her Latitude and Longitude at Noon, and her "keeping away (which I take to have been about NNE.) 32 miles," before she hove to.

of this new vortex, which seems I think to be evidently one thrown off from the great one, of which the centre as we have placed it for this day was now at ninety miles to the SW. of the *Fattel Hair*, and we cannot be *very* far wrong in her position or in *its* place also. If she had had any part of the great storm, she must have had a steady gale from the S. *Eastward*.

This is an instance then of a smaller and less intense vortex following, or being thrown off from, a large one, and it was certainly much smaller, for we find that with the wind North at Noon on the 10th, the *Fattel Hair* had it at a little past midnight at SW. or it had veered 12 points in, say, 13 hours, and was then moderating. I have thus marked it as a small circle, only to shew its independence of the main storm. I need not add that it had no connection with the *Royal Sovereign's* storms.

We have no farther data for tracing this storm within the Islands, and we have now to consider if *it* could have been the storm which dismasted the *Petite Nancy*.

I think decidedly not. We see that, presuming that it was travelling on from the 10th, and not breaking up of itself there, it must, to have reached the *Petite Nancy*, on the 11th first, have run faster than the *Fattel Hair*, which it did, since it left her with the winds from SW. at midnight 10th-11th, to SSE. at noon of the 11th, and then have overtaken the *Dido* again with another storm, from NE. or NW. striking her with its Western quadrants. The *Dido* had her second storm only on the 15th from the SE. and SW. so that she was skirting the *Eastern* edge of a storm already to the Westward of her. All this makes it probable that the *Petite Nancy's* storm was rather, if not a separate storm also, the *Briton* and *Runnymede's*, which must have been upon the Great Andaman, on the 12th, and probably between that day, and the 14th, forced its way over the mountain chains of that island, and travelled up or re-formed itself in the Bay.* The winds which the *Petite Nancy* had on the 12th when she was at 90 miles only from the body of the Great Andaman, and but a little to the Northward of the wrecked ships, were

* For an example of a storm forcing its way over high land and re-forming again, see Journal, Vol. XII. Eighth Memoir.

from the WSW. to SSW. and fine enough to allow her to carry a topmast studding sail at midnight, while, had any effect of the storm been felt by her at this time, it must have been in Northerly or N. Westerly winds. On the 13th she had the winds from WSW. to SSW. and finally at midnight South, with sharp lightning at 9 P.M. and irregular sea, with a falling barometer about this time, showing that she was now just running into the vortex.

Her hurricane appears to have been of small extent, or to have been moving rapidly to the WNW. for it lasted with her not more than from 5 A.M. to about 10 P.M., or 17 hours, during five of which, from 5 to 10 A.M. when she broached to, she was running into, and with it, and we have no data for tracing it any farther. The circumstance of its being followed by so many days of dead calm is very remarkable, and has not hitherto occurred in any of the storms which we have traced in the Bay of Bengal. We must now go back to the *Runnymede* and *Briton* to trace from their logs and positions so far as we can do so the effect of the storm wave.

We find that on the 18th, when the ships, though then in the hurricane, had not been so long enough to make their positions *very* uncertain they were at 70 miles distance, and about East and West of each other. Taking the mean of this to be an average position, and the two ships as one, since they were both cast on shore at the same place, they will then be at this time,—noon of the 10th,—in Lat. $11^{\circ} 4' N$. Long. $95^{\circ} 38'$; and the spot on which they were wrecked bearing from them about WNW. 150 miles, which represents their drift made good, from noon of the 10th to about 1h. 30m. A.M. on the 12th, or in $37\frac{1}{2}$ hours.

Now Capt. Hall of the *Briton* estimates his drift at not more than four miles per hour, and Capt. Doutty of the *Runnymede* his at three miles. Their *mean* drift (as we have taken the *mean* positions) would then be $3\frac{1}{2}$ miles per hour, which for the $37\frac{1}{2}$ hours gives a distance of 130 miles, and leaves only 20 miles to be accounted for as the effect of the storm wave, which is therefore quite trifling.

Its rise on the shore, which must have been immense to throw the ships so high, has already been noted. It would appear that all ships when blown over so far as to lay with their lee gunwales in the water

drift much more rapidly to leeward than is supposed, and seamen in these extreme cases would do well to make large allowances, which will at least place them on their guard.*

The fact that in so narrow a sea as that between the Andamans and the Mergui Coast, which is only five degrees, or 300 miles across from Islands to Islands, a true rotatory storm of such terrific violence and yet of such small extent may arise, is also new and most instructive, and it is equally remarkable to find it making about the average track from ESE. to WNW. and travelling at about the average rate of the slow classes of our hurricanes in the Bay. It would have been of high interest to have ascertained if the storm was formed in the China sea, and crossed over the Peninsula, which is here only sixty miles broad, and so low that there is almost a water communication,† or if any signs of its formation were noted on shore; but unfortunately the British territory terminates at the mouth of the Pak-Chan river, in Lat. $10^{\circ} 00'$ North, and the first European residents on the coast are to be found only at Mergui, two and a half degrees to the North of that point.

CONCLUSION.

If we had endeavoured to *invent* the most instructive lesson we could have devised for shewing the truth and utility of the Law of Storms, we could scarcely have imagined one better calculated for that purpose than this. The reader has only first to satisfy himself that the two storm circles of the 9th and 10th *must* have been nearly what they appear in the chart, and then to follow with his eye the tracks of the *Petite Nancy*, *Runnymede* and *Briton*, noticing what is said at

* As to the average rate of motion and track of the storm, we have its centre well marked at noon on the 9th, from which to midnight of the 11th-12th are 48 hours, and the distance from the centre of the 9th to the place of the wrecks, is about 184 miles; or not quite 4 miles per hour, on a course of, from point to point, N. 72° West. It however travelled from the 9th to the 10th not more than 60 miles, and thus did not make three miles per hour on that day.

† It has been roughly surveyed by Capt. Tremenhoe, B.E. who found the greatest elevation to be about 450 feet; *Journal Asiatic Society*, Vol. XII, p. 520.

pp. 363 and 364 of their falling Barometers and increasing bad weather, to be clearly satisfied that this was clearly a case in which the last two ships in a narrow sea, with a hurricane crossing their track, and in the face of every indication ran headlong into it; being tempted no doubt by the fair Westerly and S. Westerly winds, heaving or broaching to only when they could run no longer. Both commanders, indeed, when I had, by means of the transparent horn cards in my little publication, "The Horn Book of Storms," shewn them upon their own charts that they did so, fully agreed with me that had they better understood their position between the 9th and 10th they should not have run on as they did, but have hove to.

Now when we recollect what the value of the two wrecked ships with two-thirds of a European regiment on board *might* have been in India, had they been totally lost in time of war,—if there is any money value to be set on human life—it is impossible I think to rate too highly the lesson it conveys, severe as it must have been to the sufferers.

And finally when we bear in mind that this same predicament may yet occur to a whole fleet, either in the East or the West Indies,* or in any part of the world, and that a defeat from the elements may be as disastrous as one from the enemy, and by the failure of succours, involve even farther losses, I shall not I trust be thought over-earnest when I urge again on every man the intense importance of this science to Englishmen, above all other nations of the globe; and this storm is also in another light an undoubted proof of it; occurring as it has done in a sea where such hurricanes were before unknown!

* It *did* occur in the West Indies to the fleet under Admiral Rowley, and to that under the Spanish Admiral, Solano, in 1788. See Col. Reid's Work, 2nd Edition.

Some account of the Hill Tribes in the interior of the District of Chittagong, in a letter to the Secretary of the Asiatic Society. By the Rev. M. BARBE, Missionary.

MY DEAR SIR,—During my late trip to Chittagong I took advantage of the favourable state of the weather to visit the Hill tribes of that district, as a few months before I was amongst the Kookies I visited in my last trip the Bunzoo tribe. Having in my account of the Kookies described the banks of Chittagong river, I will not repeat here what has been mentioned before. I stopped one night at Rangunia, which is about 25 miles from Chittagong; and when there, I engaged the services of my old guide: this man had been of great use to me when I visited the Kookies. Having spent part of his life amongst the hill tribes, he is well acquainted with their habits; and I think that a person who is not a Government officer accompanied by him, might go with security to any of their villages. This Burman is a sportsman by profession, and consequently he can give correct information respecting the different species of animals which are found on those hills; but the characteristic custom of his nation being not to contradict persons whom they consider superior to them, when any question is put, the answer is not to be anticipated, because in every circumstance he will approve of it; so the only way to get the truth is to let him answer by himself, deducting of course something on account of exaggerations to which they are very much inclined. On the evening of my departure from Rangunia, I reached the east part of Sitacra hill, which is at two tides from Chittagong, and slept in a small village situated on the top of a hill, elevated from three to four hundred feet above the level of the river. The house in which I took up my abode belonged to an Arracanese who, having spent some years at Rangoon, spoke Burmese passably. The entrance to the house, which was elevated nine feet from the ground, was a spacious uncovered verandah; the building had several rooms: the hill being very steep on one side, the house was raised about fifteen feet on that side, and supported only by bamboos of small size. The old man received me with great kindness. He had with him eight children, one only being married. He said he was very anxious to see all his boys established; but as it was the custom to expend about 100 rupees for a bride, his means did not allow

him to marry them. Seeing the respect paid to the venerable old man and to his consort, reminded me of the life of the patriarchs.

On the morning we had a storm and heavy rain till 8 o'clock, so I could not begin the ascent of Sitacra hill before 10 o'clock; at that time the thermometer was 82°. Ascending the hill I was scorched by the rays of the sun, but the effect of the elevation was marked on the temperature; when I reached the top of the hill it was past 11 o'clock. I had the pleasure to enjoy a refreshing breeze; and at 12 o'clock, the thermometer was only 78°. Sitacra is one of the highest hills of the chain, which extends from the east to the north-east; its elevation is from twelve to fifteen hundred feet above the level of the river, and it affords the most magnificent sight I have ever witnessed. The view was extensive and charming—the sea to the S.W.; to the W., Chittagong and Sitacoond; to the N. W. the Ranee house, situated in a vast plain covered with water; Chittagong river flowing in serpentine lines, and to the E. and N. E. a succession of peaks more or less elevated, clothed with vegetation, and appearing to draw closer together as they disappeared. The horizon was an immense circle; and although the scenery was diversified, a single place could not be seen stripped of vegetation; the most elevated spots were covered with shrubs, the hills have been crowned with *Jarool* and *Toon* trees, but they have been cut down by the different tribes, when they have cleared the ground; all those places have been cultivated, with the exception of the narrow valleys which lie between the ridges of the hills. The humidity occasioned by five or six months of rain produces a vegetation full of vigour; from the edge of the water to the top of the highest hill, the flourishing aspect of nature is a proof of the fertility of the land. Few of those hills are without springs. The air appears to be very good.

People living on those hills appear to be healthy and strong. I saw some persons above 70 years old; and I was told that there was a woman whose age was 100 years. Last year many persons died of cholera. This disease was unknown to them fifteen years ago. Fever is the general complaint. I admired the idea of the Kookies, who believe that the greatest happiness of man after his death, consists in being placed on the summit of the highest hill to enjoy the pleasure of seeing the beauties of nature. The existence of a

Supreme Being who is to give a spiritual reward being above their conception, how can they imagine a greater happiness than the view of the most beautiful scenery?

Following the edge of the hill to the S. E., I passed through a village situated on the top of another hill, about 200 feet lower than Sitacra, whose inhabitants were Arracanese. I saw some Oolock and other monkeys on a high jungly jack tree, whose fruits are smaller than the common jack; they are good to eat, but have an acid taste: this tree grows very large; the wood is of a beautiful yellow color; the Burmese use it in building their boats.

When I reached the banks of the river it was four o'clock, the thermometer being at that time 88°; there I met several persons, who were waiting for me to get medicine: they begged of me to go to their village; but as it was too much out of my way, I declined their invitation. Some of them wished to accompany me; but as I knew that they were busy in sowing their crops, I would not accept their offer. These Arracanese are very hospitable, kind, and disinterested; I have been several times in their villages. They have accompanied me in my excursions, and I could never prevail on them to accept any reward for their trouble, nor for the different articles furnished during my stay amongst them. On the following morning I started from my boat, and crossed a plain for one hour in a southerly direction following a small path, and crossing several times a small stream and then ascended a hill elevated from three to four hundred feet above the level of the river, following the edge of that hill in an easterly direction. I saw at the distance of three or four miles the Bunzoo houses, situated on top of another hill called the Diamond mine; on another hill thirty or forty persons were busy in sowing paddy and cotton. It is the custom that all the people of the same village join in assisting one another for that purpose. When I reached the village it was past 10 o'clock, and the sun at that time began to be very powerful; the houses nearest to the creek were inhabited by Arracanese. The Bunzoo dwellings were on the summit of the hill; and hearing that no Bunzoo was at home, I went to the house of an Arracanese whose wife was from Tippera; she dressed like the Burmese women do, spoke a little of that language, and her features so much resembled those of the Burmese, that I took her for one of that nation. She offered me some

fruit, and a bottle of liquor distilled from rice ; some time after, the house was filled with women and children : being the first European they had ever seen, their curiosity did not surprise me. In the evening the men came from their work, and the most respectable Bunzoo of the village asked me to take up my abode in his house. His dwelling being in a higher situation, I accepted with pleasure his offer ; the house was elevated three or four feet from the ground, being twenty feet broad and eighty or ninety feet long, without any partition ; to one side was a small room which he offered me. At the entrance of the house the heads of hogs, deer, and other animals killed in his hunting excursions were kept ; a large fire-place was in the centre of the dwelling. Conical baskets, earthenware, and mats were all the furniture. The principal post of the house is considered by them sacred, and the head of the family is the only person who can touch it ; should any other person do the same he becomes the slave of the master of the house. This Bunzoo was fifty-six years old, he stood five feet ten inches, and was well built ; his hair was long, and tied after the fashion of the Burmese ; he had projecting cheek bones, flat visage, scanty beard, and was of dark yellow complexion ; his dress was a piece of cloth, one foot broad, round his loins. His wife and daughters were of middle size, but very stout ; they had the Burmese dress, but the cloth was red and black ; their breast was covered with another piece of cloth of the same color, one cubit broad and four feet long. His family consisted of four boys and three girls ; he had two children from eight to ten years old, with black eyes, small lips, and displaying great intelligence. The other Bunzoos which I saw were not so tall as the men before mentioned, and the average is, I believe, from five feet two inches, to six inches. The women are, generally speaking, much stouter than the men. This tribe appeared to be grave and silent ; this is remarkable in children, they shew no petulance, and partake of the character of their parents ; six or seven of them were with me a part of the evening, and to my great surprise they paid as much attention to the conversation, as if the subject had been adapted to their intelligence. I was particularly struck with their civility, no one took a thing offered to him without previously saluting by joining his hands towards the person who gave, and the same ceremony was repeated by the donor : men, women, and children do the same ; when spirits is offered,

the women dip their finger in the liquor, and then salute as before stated.

The Bunzoo food consists of rice, fruit, roots, vegetables, young leaves of trees, blochein, (which is prepared by the Mugs of Rangunia of shrimps salted and pounded,) and deer, hogs, fowls and goats. The Bunzoos admit the existence of a Supreme Being whom they do not worship, the reason being that "they have never heard about him nor seen him;" but it is not the same with the devil, whom they consider as the cause of all evil,—to him they attribute their diseases, the failure of their crops, &c., and to gain his favour they offer him pigs, goats, fowls, &c.; they believe in a place of torment, but what are the offences that deserve such punishment they don't know; they think that the greatest part of the dead come again into the world to animate other bodies, and persons who have been fortunate enough to secure the head of many wild animals are entitled to be rewarded in their future life: this is the reason for which they keep with the greatest care the heads of animals slain by them. The Kookies burn the dead, the Bunzoos do not. They hollow a piece of wood, deposit the dead in it, and bury it in the summit of some hill, putting in the same grave the heads of animals killed by them, spears, cloth, and money belonging to the deceased. On the Tenasserim coast the Kareans burn the dead, and keep one of the bones of the head for one year, and after feasting for some days, they take it with all the articles belonging to the deceased, on a hill where all articles are deposited which belonged to persons of the same caste. The Bunzoos never marry to persons of another tribe, and a wedding never takes place without spending much money. The father and mother of the young man apply for the bride, which is never promised unless she give her consent; should the young man be without parents the head of the village is to ask the bride's hand, the relations of the lady ask then a sum of money, from one hundred to one hundred and fifty rupees; if the young man has that money he pays it immediately; but if he has not, the bride's relations agree to receive it by instalments. The day of marriage being fixed, a feast is given to the relations and friends, and the young woman is taken by them to the house of the bridegroom, and without any further ceremony, the maid becomes wife. They have but one wife, and if she leaves her

lord's house without a just cause, her relations are obliged to give back the money received, but should the husband send her away he has no more claim. Should the Bunzoo, in his warlike excursions, capture any young women he generally sells them, but if he cannot he has them under his keeping without being considered his wives; their consorts are generally well treated, but they are far from paying them the same attention as the civilized people do. One of them asked me in the most serious manner if it was true, "that Europeans worshipped their wives." The chain of hills which separates Chittagong and the Tippera district from the Birman Empire is inhabited by a number of tribes differing little in appearance, but partly in habits and language; but the features of those tribes, particularly the flatness of the occipital bone, resemble the Burmese so much that I am not far from believing they have a common origin, and if the Bunzoos are not so strongly built, and so well made as the Burmese, it might be in consequence of their mode of living, which, as it has been observed by Cuvier, in few generations will deteriorate the physical character of the highest races of mankind. The Kookies appear to be the most numerous of all tribes; to the N. E. of Chittagong, not far from *Casalon* which is a branch of the Chittagong river is one of their kings, who rules over six or seven thousand houses; he has on his hill ponies, cows, &c. How far he takes advantage of his authority, I have not been able to ascertain. The Bunzoo tribe is chiefly centered towards the S. E.; having no annals of their own it is impossible to trace their origin, and to warrant an opinion on the subject, requires more information than I could get. According to them, formerly they were more powerful and numerous than they are now. The Kookies taking advantage of their number, subjected them to their yoke. Their language appears very poor, they have no word to express the days of the week, but borrow them from the Burmese. Their dialect contains many Kookie and Burmese words. They compute their years as the Kookies do by the number of their crops. Persons who build theories on the analogies of language, will find at the end of this letter a small vocabulary which will assist them. The Bunzoos distil from rice a fermented liquor, the drinking of which seems to afford them great luxury. They pour into a cup the spirit; which goes round the company, every person, not excepting the women and children, taking a draught, and they never separate till the liquor is finished; but how far

drunkenness prevails, or if they are addicted to intoxication, is more than I can tell. The Arracanese who live on the hills pay from three to four rupees of land-tax a year, but the Kookies and Bunzoo are rent-free; and should they be compelled to pay, being a wandering tribe free as birds, they would immediately leave their residence, and retire to the interior of mountains where no person could molest them. They are certainly the most independent people that can be seen: a no-made life is for them the greatest happiness, and, as children of nature, their wants are few; and these wants they can supply in any place. They venture on hunting excursions when their agricultural labors are finished; spears and bows are their principal arms, and their dogs are always their faithful companions. Their exertions and agricultural labors are directed only to the growth of articles necessary for their subsistence, as paddy, yams, plantains, melons, tobacco, cotton, &c. They manufacture their own cloth, and exchange the cotton they do not require for salt, earthenware, &c. They plant a species of indigo growing about two feet high, the leaves which are large are employed to dye their clothes, which is done in the following way:—Taking a certain quantity of leaves, they put them in an earthenware vessel; when the water boils they dip in it the thread, mixing with it an extract of an astringent bark; they dry then the thread, and they repeat twice again the same process. The jungle affords them roots of trees or shrubs to dye green, yellow, &c.: salt is the only thing which they procure with some difficulty, but the hills contain several springs of salt water; two of those are found at Sitacoond, and there is another one in a creek on the opposite side of Sitacra. The greatest part of salt used by people living on the banks of the river was manufactured formerly there, and the spring is so impregnated with salt that it gives in weight half the quantity of the salted water; some of the tribes by burning trees procure an alkali, which supplies the use of salt.

The Guayal, *Bos frontalis*, is found amongst the hills, particularly to the south of Sitacra: there are two species, differing in size and little in color; the large one is of dark brown, and the male is nearly as high as a female elephant; the small one is of a reddish brown, it is the Tenasserim Bison, and the Arracanese call them by the same name as the Burmese do. Those Guayals are perfectly distinct from the Shio of the Kookies, which are smaller, have a projecting skin to their neck, and

differ also by the form and direction of the horns. Three species of wild dogs are found on those hills: the first species is known by the Burmese by the name *Oobe-looe*, and by the Bunzoos *Izenia*; this dog has pendant ears, from five or six inches long, muzzle from eight to ten inches, straight bushy tail fifteen inches long, length of the body three feet six inches, height from the ground two feet six inches; they are seen going alone or in pairs, and they never feed on animals killed the day before. The second species is called Mungui; they have the ears semi-pendant, going in packs from four to five; their color is white bay or spotted. The third species is *Tokooi*, they are small with straight ears, and go in packs from fifteen to twenty. The description of these dogs was given to me by my guide, and it was confirmed by the Bunzoos; I have no doubt of its being correct.

Returning from the Bunzoo villages, instead of following the same road by which I went there, I followed the course of a small stream protected from the rays of the sun by bamboos and other trees; another reason which made me choose this way was, that I had been informed that limestone was found in that creek; till now rocks of that nature are unknown at Chittagong, lime used in the district is carried from Sylhet, and purchased at the rate of thirty-five to forty rupees the hundred maunds.

It took me about three hours to get to Chittagong river; both banks of the creek were bordered either by rocks or by hills of various heights, presenting steep sides covered in some places with shrubs, the spring was not considerable, the water was fresh and clear as crystal; in some places the stream rolled gently down, and in others the water descended with impetuosity, forming basins of different dimensions according to the size of the defile: the place where the rock was mentioned is about a mile from the large river, it is from thirty to twenty-five feet high, and in a large cavity is deposited stalagmite, so I have very little doubt that the rock is a limestone; but as I expect a specimen of it, all doubts will be removed on the subject. At some distance from that rock was a bank of black clay, which the Burmese doctor recommends as a medicine to women who are in the family-way to strengthen them. I took some with me, the clay was then very soft, but the next day it was as hard as a brick.

This is, my dear Sir, all the information I could get about the Bunzoo tribe; had I remained longer amongst them, as I intended to do, this people would have given me other details which are desideratum in this imperfect sketch of their manners and customs, but my guide having taken ill with fever, I thought it was useless to prolong my stay amongst them, being imperfectly acquainted with the corrupted Burmese language spoken in the district.

V. BARBE.

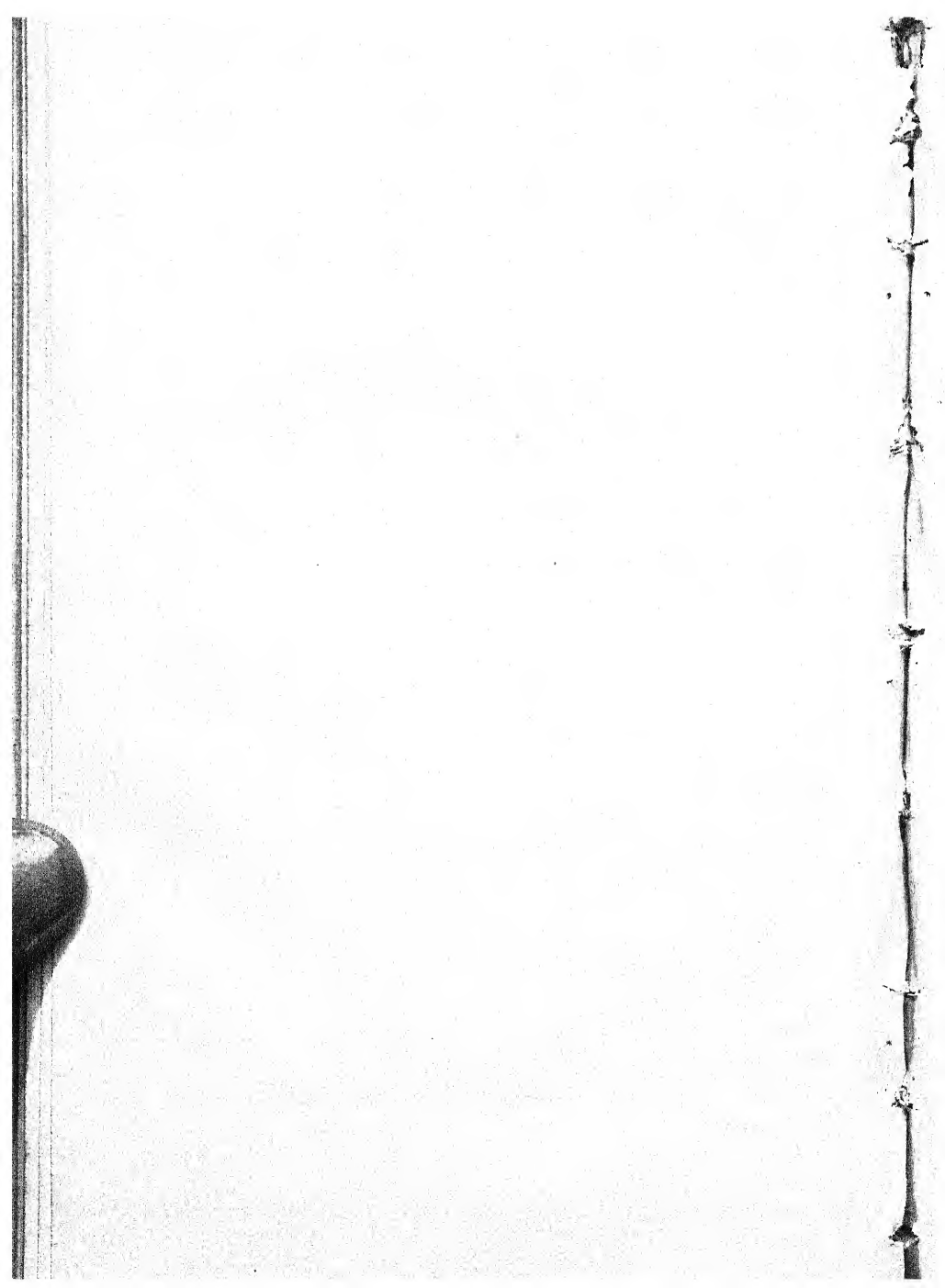
Calcutta, 15th July, 1845.

<i>English.</i>	<i>Bunzoo.</i>	<i>Kookies.</i>
God,	Lookar,	Ngion mse.
Devil,	Krec,	Khasin.
Worship,	Mai-moo-roon,	Maimeck.
Person,	Mreiur,	Meiaur.
Man,	Mepa,	Mepa.
Woman,	Loo-now,	Noonoo.
Children,	Now-pow,	
Son,	Mepanow,	
Daughter,	Kemenow,	
Maiden,	Loogua,	Ar.
Husband,	Noo-pa,	
Wife,	Kamadoon,	
Head,	Loo,	Loo.
Forehead,	Mare,	
Hair,	Ssom,	Ssam.
Eyes,	Mhe,	Mut,
Nose,	Nhar,	Naar.
Ear,	Na,	Na.
Lips,	Mekka,	Noor.
Teeth,	Ah,	
Beard,	Mekkamoor,	
Neck,	Rhin,	King.

<i>English.</i>	<i>Bunzoo.</i>	<i>Kookies.</i>
Breast,	Atak,	Fsan.
Arm,	Keeb-an,	
Hand,	Coot,	
Finger,	Cootmatsar,	
Nail,	Cootmetee,	Coot.
Belly,	Madeer,	Madil.
Thigh,	Racoot,	Ell.
Leg,	Pai-ma-rai.	
Foot,	Pai,	Phai.
European,	Lhen,	Mengeaco.
Bunzoo,	Bom.	
Khookies,	Panguai,	Langet.
Shiamdu,	Kosak,	
Burman,	Ouksah,	
Arracanese,	Mareim.	
House,	Cur,	Teug.
Roof,	Curchun,	
Thatch with grass,	Phar,	
Bamboo,	Rhooar,	Kooe.
Ratan,	Kotoi,	
Posts,	Jurtoom,	
Door,	Ma kott,	
Window,	Wham kott,	
Dog,	Woee,	Hooee.
Cow,	Fswepai,	
Buffalo,	Fseloi,	
Guyal,	Tsar,	
Ditto Kooku,	Huesha,	Shio.
Pig,	Wai,	Wet.
Bird,	Wha,	
Peacock,	Oohdong,	
Snake,	Marooi,	
Hill,	Kamoor,	Toung.
Tree,	Teiu,	Thinn.
Ditto leaves,	Teiuna,	
Flower,	Par,	Paar.

<i>English.</i>	<i>Bunzoo.</i>	<i>Kookies.</i>
Grass,	Bair,	
Good,	Hatsar,	
Bad,	Hats-aloo,	
Heaven,	Van,	
Hell,	Hatsoopatee,	
Black,	Neekna,	
White,	Pooahklan,	
Red,	Pooahsin,	
Green,	Pooahrin,	
Yellow,	Pooahapaal,	
Water,	Tooe,	Tooe.
Paddy,	Ts-am,	Tsan.
Rice,	Tsaksai,	Thathin.
Ditto boiled,	Boo,	Boo.
Oil,	Kersee,	
Brandy,	Arahoni,	
Sick,	Hatchong,	
Fever,	Damloo,	
Vomit,	Mailoo,	
Evacuate,	Sun-yute,	
Fool,	Maremkloh,	
Cool,	Atakdye,	
Knife (table,)	Tsenzoon,	Tsur.
Fire,	Men,	
Silver,	Tongkha,	
Gold,	Guoon,	Gnoon.
Copper,	Dhar,	
Necklace,	Maisee,	Shal.
Bracelet,	Arkhoil,	
Handkerchief,	Beaar,	
Governor,	Kophoo,	
Bengalee,	Koar,	Lowoon.
Death,	Meetec,	
River,	Whaa,	Boo.
Firelock,	Tselei,	Thali.
Powder,	Tseleitsec,	Talaitse.

<i>English.</i>	<i>Bunzoo.</i>	<i>Kookies.</i>
Shot,	Tseleimoo,	
Bottle,	Pelan,	
Year,	Koomnee,	
Month,	Tsakkar,	
Day,	Neekar,	
Night,	Zytye,	
One,	Kakar,	Keaka.
Two,	Penakar,	Panika.
Three,	Toomkar,	Toomka.
Four,	Leckar,	Ta.
Five,	Raignakar,	Nga.
Six,	Rhookar,	Koo.
Seven,	Sreckar,	Sree.
Eight,	Raika,	Rae.
Nine,	Khooakar,	Ko.
Ten,	Tswurkar,	Sunka.
Eleven,	Tswinlakakar,	
Twelve,	Tswinlanekar,	
Twenty,	Roobookar,	
One hundred,	Raizaaker,	Rasa.
One thousand,	Tsankar,	Sunka.
Man's dress,	Ram,	
Woman's dress,	Kyer,	



JOURNAL

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ASIATIC SOCIETY.

Notes on the Religion of the Sikhs, being a Notice of their Prayers, Holidays, and Shrines. By Major R. LEECH, C.B., Political Agent, N. W. F. From the Political Secretariat of the Government of India.

The works of "Guroo Sobha" and "Bichitar Natak" have been consulted, and extracts made.

It will appear extraordinary that the Sikhs, who are forbid to worship at a Hindoo Mándar, should frequent Hindoo places of pilgrimage; but such is the case. Sikh pilgrims to the Ganges at Hurdwar have for many years past been increasing, and nothing is more probable than the Sikhs gradually re-adopting many more Hindoo observances.

Govind Singh prophesied that the Sikh's Derahs, or Shrines, would amount to 56,00,00,000.

Prayers.

The Sikh Japjee, composed by Guroo Nanak, answers to the Hindoo Gaitree repeated in the morning.

The Sikh Japjee, composed by Guroo Govind Singh, answers to the Hindoo Bisan Sahansar, (a morning prayer).

The Sikh Sukhmanee, composed by Guroo Nanak, answers to the Hindoo Geeta, (a morning prayer after ablution).

The Sikh Rouras, composed by Guroos Nanak and Govind, answers to the Hindoo Sandhija Tarpan, (a sunset prayer).

The sixteen Arthees, composed by Guroo Nanak, are repeated the last thing before going to sleep, and it is the lock on the tongue; the key being next morning's Japjee.

The Sikh women repeat "Asá kee wár," (composed by Guroo Nanak,) by which they are absolved from again being born in the likeness of woman.

Holidays.

The Daserah, the Suddee, 10th of the month Asoo, the commencement of the Hindoo military year, the opening of the season for the military operations.

Basakee, the spring festival on the 1st of Besak.

The anniversary of Guroo Nanak's death on the Wuddee, 5th of Asoo, (called Gur-parb).

The anniversary of Guroo Govind Singh's departure on the Buddee, 5th of Besak.

The Dewalee; a feast of lamps, the last day of the Buddee, half of the month Katick.

Maghee; the last day of the Buddee, half of the month Magh.

Basant Paunchmee; the Buddee, 5th of the month Magh.

The Hola, (Holee); the last day of Phagan.

Shrines—Of the 1st Guroo, (Nanak.)

1. Nankane-a-Derah, the village of his maternal grandfather, where he played as a child, 30 kos from Lahore.

2. Derah (par excellence,) on the river Ravee, his birth-place. (He is said to have been born ready dressed in green.)

3. Sultanpoor, where he kept a shop for his brother-in-law. The weights used by him are worshipped.

4. Nanak Malak, an impression of his hand on the leaves of a Peepul tree; the leaves are brought away as relics, and the tree is worshipped. There is now a flourishing village.

5. Panjah Sahah; the impression of his hand on a rock that he prevented falling on him at Hasan Abdal.

Of the 2nd Padshah, (King) Angad.

1. Khadoor Derah; the place of his death, near Taran Taran.

Of the 3rd Guroo, (Amardas.)

Gondwal Derah ; a well of 101 steps to descend, on each of which the Japjee is repeated. He also died at this town. There are two Grunths at the spot whence he departed.

Of the 4th Guroo, (Ramdas.)

Sree Amritsar, (the Nectar tank) ; was brought into notice by him, though the Sikhs deny that it is modern. It was first called by him "Ramdas dee puree." There are five Teeruths.

1. Amratsarjee ; in the centre of which is the Darbar Sahab's building, containing the Grunth in Guroo Nanak's own hand-writing. It was built by Runjeet Singh, or rather superbly repaired. The steps of this building are looked upon as the Hurdwar ones. The rank Sikhs of the present day therefore do not go to the Ganges Hurdwar, and even speak lightly of that sacred stream as the "bone-devouring."

2. Koulsar, (the Lotus tank) ; people wash their feet here before presuming to bathe in the holy of holies.

3. Babegsar ; round which the Nahangs reside, and bathe in it before going to the Amratsar.

4. Mukatsar ; from bathing constantly in faith, in which exemption from further birth in the flesh is obtained.

5. Ramsar ; the tank in which Hindoos and others, not Sikhs, bathe before going into the water of Amratsar.

On the brink of the tank opposite Darbar Sahab's Darsanee entrance is the Akal Bangah, and two jhandahs or standards, (rather giant spears covered with gold, and having a khinkab cover.)

The golak (collections $1\frac{1}{4}$ rupee from each convert,) of Guroo Govind Singh, is deposited in the Akal Bangah. Chiefs sometimes pay $1\frac{1}{4}$ hundred rupees on the Pahul being administered there to a child.

The Deewalee festival is the season for performing pilgrimage to Amratsar. Pilgrims also assemble in Basakee, Dassera, Horee and Niaghee. These five festivals are called the five Dhams or Tihars.

Of the 5th Guroo, (Arjan.)

1. Lahore ; his residence for many years.

2. Derah-Kartarpoor.

3. Taran and Tāran ; two shrines, five or six kos apart ; the latter being the place of his death.

Lepers are cured by bathing in faith in the tank. A great number of lepers reside round the tank, and two or three are cured every year. If any one on going there fears to approach or touch these lepers, he becomes himself a leper. Many of them are rich, and trade; no customs or duties are levied on their goods.

Of the 6th Guroo, (Har Govind.)

Sree Govindpura; his Derah, the place of his death.

Of the 7th Guroo, (Har Râe.)

1. Keertpur; his Derah, the place of his death, and also of his Mahal (wife). The tank in which he washed his feet is called, by the Sikhs, Charan Koulсар.

2. Bangah, in the Singpooria state; at Keertpur is the Derah of Baba Gurditta.

Of the 8th Guroo, (Har Krisen.)

1. Delhi; the place of his death, (by small-pox.)

Of the 9th Guroo, (Tegh Bahadur.)

1. Dehra, at Anandpoor; where his head was burnt on being brought by his Rangretas from Delhi.

2. Saifabad, in the Pateala territory; where the Raja has lately built a fort.

3. At Delhi, called Bangala; where he was killed.

4. Ditto; where his body was burnt. There is also at Delhi a shrine of Mata Sundaree, and another called Rakabganj.

5. At Benares.

Of the 10th Guroo, (Govind.)

1. Anandpoor; where there are seven Jhandas and Dehras.

1. Guroo Tegh Bahadur.

2. Kesgurb; where he converted five Sikhs, or rather initiated them and made them initiate him, and let their hair (kes) grow.

3. Mata Jeeto; the wife (Mahal) of Guroo Govind; she died here.

4. Damdama; the breathing-place, where he took breath and turned on his Musalman pursuers.

5. Holgurb; where he played the Holey.

6. Agampura ; from a vision revelation to Mata Jeeto there.

7. Manjee Sahat ; the cot on which she sat to receive salutations.

There is a melah or collection of pilgrims in the Holee.

2. Dehra of Guroo Govind at Bangah.

3. Jandpoor ; where he halted in his flight from Anandpoor.

4. Macheewara ; where his Musalman friends, Nubee and Ghunee Khans, saved his life, by disguising him.

5. Naknour ; five kos from Ambalah, where he fled from Macheewara.

6. Muktsar, in Malwah ; where he bathed and promised exemption from transmigration to all his followers who did the like in faith.

7. Damdama ; where he again took breath, and blest the place as learning-inspiring, calling it his Benares, where the greatest dunces should become scholars.

At the present day the best writers of the Gurmukhee character are at Damdama, which belongs to the Shaheed family.

8. Kapal Mochan, near Belaspoor. This is a great place of Hindoo pilgrimage.

9. Nanherree, near Ambalah.

10. Pa'unte Sahat, across the Ganges.

11. Patna ; where he was born.

12. Abjal Nagar ; where he died, (in the Deccan). There is a melah on the Buddee, 5th of Besak.

There is a Derah of Jeet Sing and Jazar Singh at Chamkour, where these sons of Guroo Govind were killed by the Musalmans.

The Derah of his two other sons, Fattah Singh and Zorawar, is at Sarhind, where they were built alive into a wall by the Musalmans.

Sarhind is called by the Sikhs, Fattahgurrh ; from Fattah Singh being killed there. They also call it Phit moonhe (spit in the face,) and sometimes Ujar shahr, "the desolate city."

The Derah of Mata Guzaree is near that of her Shahzada, grandsons ; she fell down dead at the sight of the living wall. There is a melah during the Holee.

There is a shrine or Derah of Baba Sahat Singh, at Ambalah, who was a Bedee Sikh ; who is called by some the 11th Guroo, and is said to have caused the elevation of Ranjeet Singh by his blessing, and by giving him his sword : he died eleven or twelve years ago, from grief at

the death of his son, Baba Tegh Singh, which took place at his residence at Unnah.

At Daoon, there is the shrine of Baba Jwahar Singh Sodee.

At Gadgunga, there is the shrine of Uhadah Singh Sodee.

At Gadwal is the shrine of Guroo Ram Raee, where he died.

The offerings of these shrines are taken by the people who read the Grunth there, and offer prayers for the donors.

Notes, principally Geological, across the Peninsula of Southern India from Kistapatam, Lat. 14° 17' at the Embouchure of the Coileyroo River, on the Eastern Coast, to Honawer, Lat. 14° 16' on the Western Coast, comprising a visit to the Falls of Gairsuppa. By CAPTAIN NEWBOLD, F.R.S., M. N. I. Assistant Commissioner Kurnool, Madras Territory.

Kistapatam. Kistapatam is the port of Nellore, from which it lies about 15 miles S. E. It is situated on the Coromandel Coast a short distance from the sea, and at little more than two miles North of the mouth of the Coileyroo or Condaleyroo river, in about Lat. 14° 17'. N. It stands at the edge of a low sandy flat which, though now dry and exposed, appears during the monsoon to be overflowed by the river freshes, and probably once formed a back-water or lagoon communicating with the sea to the N. near Toolypaliam, and with the embouchure of the river near another Toolypaliam to the South. Sea salt is here manufactured. The physical aspect of the adjacent country is that of a flat, sandy, maritime plain, broken near the sea by an irregular line, following the indentations of the Coast, of low dunes of fine sand, by which the travellers' bungalow on the S. bank of the river is surrounded. The sand a little N. of this abounds in granules of magnetic iron, some of which appear to be titaniferous. The understratum of the sand observed here, and in some wells a few miles to the South of the river proved to be greenish or bluish black clay, or tertiary clay of Coromandel, with pelagic shells similar to that underlying Madras, Pondicherry, and the alluvial plain of Masulipatam.

Marine Sand Dunes. The sand dunes near the river had a S. W. direction, and rose about 50 feet above its bed. The ripple marks

caused by the currents of air on their surface resemble those caused by currents of water, and the N. and S. direction of their major axis shows the Easterly and Westerly course of the late or existing prevalent winds. Their Eastern sides have a sloping direction; falling off rather abruptly to the West at about an angle of 45° , indicating that the wind which raised them blew *from* the E. On the surface were scattered here and there shells and fragments of shells blown up from the beach. The footsteps of waders, and other aquatic birds could be occasionally tracked where the wind had not again covered them up with loose sand.

These, together with the ripple marks, marine shells, and the elevation of these moving sands, form an interesting example of the manner in which strata of aqueous sub-marine origin may be imitated by the simple action of the wind on loose sand. Consolidation, and a more distinct stratification alone are wanting to convert these heaps into a fossiliferous ridge. The sand is often bound together by the long interlaced roots of grasses, &c.

Calorific action of sun's rays on surface of Sand Dunes. At 5 P. M. sky clear, slight breeze just perceptible; the thermometer placed on the sand and freely exposed to the sun's rays indicated a heat of $100^{\circ} 3'$. Simply suspended in the air, about 12 feet above the surface of the sand, equally exposed to the sun's rays, it stood at $78^{\circ} 5'$.

Nocturnal Radiation from surface of Sand Dunes. The radiating powers of the sand dunes are considerable. At 3 A. M., night nearly calm, sky clear, the thermometer shaded from radiation, and placed on a table about four feet from the ground, stood at 67° . Placed on the grass and freely exposed bulb thinly covered with a little white wool, it fell to 65.5° . But on the surface of the sand dunes it fell to 62° . The sand is fine and quartzzy.

As ærial stillness is one of the conditions necessary to the full refrigerating effects of radiation, it is likely that on the coast, which is hardly ever free from currents, however slight, resulting from the regular alternations of the land and sea breezes, the differences of temperature obtained by radiation will hardly ever be so great as the table-lands of India. The lulls between the land and sea breezes perhaps present the most eligible times for such experiments.

The temperature of the water of the wells is not far from what may be the mean average temperature of the place, viz., from $80^{\circ} 2'$ to 81° .

The bed of the river near Kistapatam is apparently about 500 yards broad, and sandy. A bar of sand obstructs the mouth, against which the surf beats in white breakers. The Collector's bungalow stands on the N. bank of the river.

Nellore. Circumstances prevented my examining the tract between the sea at Kistapatam and Nellore; but as far as could be judged from rapidly passing over it, it resembles in flatness (sloping gently seawards) the rest of the maritime plains of the Coromandel Coast, and abounds with small tanks. At Nellore the usual granitic and hypogene rocks of this coast are covered by beds of laterite, which are seen in cliffs about 16 feet high fringing the Pennaur river. About three or four miles from Nellore, on the Northern bank of the river, quarries of the laterite occur at the village of Kohor, in a deposit of this rock about 20 feet thick near the tank. Both at Nellore and the surrounding villages, it is extensively employed as a building stone, and in other repairs of the roads. Blocks, about one foot thick and two long, are sold at the rate of 12 for the rupee. Small springs are seen oozing out at the bases of the laterite cliffs on the S. bank of the river at Nellore. These cliffs are divided by perpendicular and horizontal seams; the rock composing them is less quartzy than the Kohor laterite. In the vertical fissures I observed fragments of earthenware broken by the natives in coming for water. These bits of pottery often become impacted in a lateritic alluvial cement, which must not be mistaken, as has been the case, for the true laterite, and hence its origin ascribed to the recent or historic period. Some of the oldest pagodas and structures in South India are built on this rock. Both the laterites of Nellore and Kohor consist of a rock resembling the Malabar laterite, but containing more angular fragments of quartz. The surface of the laterite is often covered by a modern lateritic debris, more or less consolidated, which must not, as said before, be confounded with the true laterite.

As in the Beder laterite the water often passes from the surface of these cliffs by the tubular cavities in its structure which are enlarged, emptied of their clay and lithomarge, and modified by its passage downwards, until stopped in part by the clayey barrier it has assisted to accumulate. The water here forms reservoirs, and in overflowing finds its way out by fissures in springs. The bed of the Pennaur near Nellore is sandy, and apparently about 800 yards broad.

From Nellore by the North bank of the Pennaur to the base of the Eastern Ghauts.

Sungum. From Nellore by Kohor the laterite may be traced westerly to the vicinity of Dovoer, resting on the granitic and hypogene rocks about nineteen miles W.N.W. from Nellore. At the Sungum, or confluence of the Pennaur with the two small streams of the Bogheyroo and Berapeyroo, the first rocky elevation is seen since quitting the coast about twenty-nine miles distant, and nearly midway between the sea and the Eastern Ghauts. It appears as a short range abutting on the Pennaur river, and running N. by E. to about the distance of two miles. It is composed, at the village of the Sungum, of a massive quartz rock in indistinct stratification, cleft occasionally, like the laterite, by intersecting partings and vertical fissures which divide the rock into parallelograms. The planes of the former have a dip of about 5° towards the East: the vertical fissures run irregularly, but the greater part have a direction of N. by W. This quartz rock passes from opaque and granular, to compact, translucent chert, of various shades of red, brown, green, and white. It contains disseminated scales of mica of a golden colour, which glitter like those in aventurine, and nests of brown iron ore.

If the marly horizontal partings are really the planes of stratification, it may be inferred from its conformability that this quartz rock does not belong to the hypogene series which is seen in highly inclined beds near its base, penetrated by veins of granite (as seen at Pollium, a village between Dovoer and Sungum,) but that it is an altered outlier of the sandstone mural crests which are seen from this on the Western horizon capping the granite and hypogene schists of the Eastern Ghauts.

A glimmering hornblende schist, and gneiss veined with granite, with a white mica replaced here and there by schorl, are found at the bases of the quartz hills of Sungum.

A cluster of Hindu temples, the principal of which is dedicated to Iswara, as at the holy Sungums (or confluences) of the Kistnah, Bhima, &c., surrounded by a lofty wall, crowns a rugged mass of this rock that projects from the main ridge into the sandy bed of the river, which at this season of the year presents a dreary waste of sand,

apparently marly, a mile in width, through which a slender crystal stream of water threads its way towards the sea. In front of the temple gates stands a granite slab, bearing a Sassanum, or inscription, in Nagri and Telugoo, almost buried in drifted sand. The emblems of eternity, (or rather durability)—the sun and moon—were engraven on the corners above the inscription. The priests of the temple are brahmans of the Smartal sect, whose Suami or bishop is the powerful Sencra Bharti. The remains of an old aqueduct are seen at a little distance from the Sungum. The village itself contains about 400 houses, though it appears formerly to have been a place of greater wealth: a few cotton cloths are manufactured here. The staple articles of cultivation are rice, baggi, or juari, and a little indigo.

Temperature of the Pennaur river. The temperature of the water in the Pennaur was 77.3° ; of the springs 78.2° at 4 p. m. Temperature in open air at the time 82° .

From the Pennaur to Jummaveram and Copper district of Ganypenta. Leaving the North bank of the Pennaur at Sungum, the road lay in a N. by W. direction to Jummawdram, or Jummaveram, distant about ten miles from Sungum. The rocks here are still the hypogene schists, chiefly garnetiferous hornblende schist, and gneiss, with large veins of whitish quartz, the fragments of which are scattered over the uncultivated surface of the plain. The soil is reddish, both sandy and clayey, and rests either on a substratum of kunker and detritus of rock, or on the rock itself. Two out of the four wells at Jummaveram are saline.

The hypogene schists penetrated by trap and granite, extend from Jummaveram to Ganypenta or Gurumanipenta, a village about twenty-three miles N. N. W. from Jummaveram, about thirty-three miles North of the Pennaur about the same distance from the sea, and about twenty-eight miles from the base of the Eastern Ghauts.

This village is situated in the midst of the copper mining localities described in a paper published by the Royal Asiatic Society in their Journal.

From Ganypenta to the E. Ghauts. Proceeding from Gurumanipenta in a S. W. direction towards the entrance of the Dorenal Pass over the Eastern Ghauts, the surface of the great plain hitherto travelled over becomes more rugged and broken up by rocky elevations,

till at length the base of the Ghauts is reached near Udigherry. The hypogene schists, penetrated by granite and dykes of basaltic greenstone and overlaid by patches of kunker, continue up to the base of the Ghauts. Mica schist is seen at Samulraygudda, about four and a half miles E. S. E. from the town of Udigherry, and also about seven miles farther to the S. W. at Timmapolliam with quartz rock. Several of the hypogene spurs in the plain are capped with this quartz rock, which is usually of a light reddish colour passing into greenish grey, and white cherts. It is evidently altered sandstone. The hypogene schists are in great confusion at the base of the Ghauts, and in one place I observed the mica schist dipping at an angle of 41° to the W. *i. e.* towards the great line of dislocation. In some places they are but little inclined; in some vertical; while in others they appear to have been reversed, and folded back upon themselves, the upper parts of the flexures having disappeared in weathering or by denudation. Hence they have the appearance of alternating in a reversed order to that in which they usually occur, *viz.*, the gneiss lowermost in the series. This occurs in most other hypogene areas of South India, and care should be taken to ascertain in such disturbed regions the true order of superposition from the horizontal or less inclined beds in the neighbouring districts less disturbed, and where there is no likelihood of inversion or folding back of the strata. These phenomena, though written in plainly legible characters on the faces of the gigantic escarpments of the Alps, must in Southern India generally be patiently traced out, letter by letter, amid the jungle and debris which usually obscure their features.

Eastern Ghauts. The Eastern Ghauts, in the vicinity of Udigherry, and the Dorenal Pass, have an altitude, approximatively obtained by a rough trigonometrical measurement, of about 700 feet from the maritime plain at their base, which is from 60 to 70 miles broad, its surface roughened by spurs from the Ghauts, and a few occasional rocky clusters and detached hills.

The Ghauts here have usually their escarpments, or steepest acclivities facing towards the East. The lower portions of the hills, which are composed of mica slate or gneiss, have usually a much less abrupt and steep descent than the sandstone, which often caps them in mural cliffs and hog-backed ridges. The line of junction of the two rocks

is thus often plainly visible in mountains many miles distant. The hypogene schists seldom attain a height of above 400 feet; the higher portions are sandstone. The sandstone, in the localities where I examined it on the heights overlooking the Dorenal Pass, had much the appearance of quartz rock passing into chert or hornstone, of various light shades of red, brown, green, blue, black and white.

Pass of Dorenal. This break in the Easternmost chain of the Eastern Ghauts is about four miles in length, general direction W. by N., and is evidently a transverse valley of fracture, passing nearly at right angles with the direction of the strata, and with that of the longitudinal vallies. The Northern side is abrupt and craggy, while the abrupt features of the Southern flank are more rounded and softened down. Its bottom has an irregular surface, occupied by angular rocky debris, the wreck of strata once continuous, and is now partially covered with both arboreous and shrubby vegetation. The ascent from the East, partaking of the general character of the Ghaut elevation, is steeper than the descent to the West; but it is every where passable for loaded carts, and is one of the best channels of commerce from the maritime plains of Nellore and Ongole to the more elevated districts of Cuddapah, Bellary and Kurnool. The best sort of cart adapted for this hill transit is that with the narrow sharp wooden wheels girt with strong iron fellies, and having axles revolving with the wheel. I saw about fifty return carts, laden with empty indigo boxes, returning from the town of Nellore to the indigo factory at Budwail in the Cuddapah district. Five hundred Lumbari bullocks, laden with salt, the manufacture of the coast, were jogging merrily on, to the music of their own bells, with this high-taxed necessary of life, into the interior.

Valley of Budwail. From the Pass of Dorenal the traveller descends by an easy slope into the longitudinal valley of Budwail, which is crossed in a W. N. W. direction to the Western and principal chain of the E. Ghauts. This fine valley has an almost S. direction inclining slightly to the E., and extends from the Kistnah beyond Cumbum on the N. to Tripety on the S. with some interruption from occasional cross lines of elevation and fracture, passing a little East of Sidhout to the cross fracture forming the valley of the Pennaur; whence its course may be traced southerly by the channels of Cheyeyroo and Goonjna streams, by Chitwail, Codoor, Baulpilly and Curcumbady.

On the line of the cross valley of the Pennaur near Sidhout a considerable subsidence, or sinking down of the surface, appears to have taken place; as near this point we see both the Northern and Southern lines of drainage of the longitudinal vallies of the E. Ghauts, viz. the Cheyeyroo, the Toomall and Sagglair, converge and empty themselves into the Pennaur, easterly through the cross fracture of Sidhout to the sea. The general breadth of the valley of Budwail North of the Pennaur, is about eleven miles. From Poormaumla on the N. to the Pennaur it is sub-divided into two vallies by a central range of hills, which passes by the town of Budwail; the lowest parts of these vallies are marked by the S. courses of the Toomall in that to the East, and by that of Sagglair in the valley to the W.

In the valley of Budwail the Cuddapah limestone with its associated argillaceous shales of different shades of red, chocolate, white, yellow and green, are first seen, the latter predominating. The central range consists chiefly of sandstone based on these shales, which are often denuded, and appear in the vallies between ridges capped with insulated massive layers of sandstone and quartz rock several miles asunder.

Westernmost ridge of the Eastern Ghauts. The Western, or principal ridge of the E. Ghauts is crossed by the Oothoomnagoo and Jungumrazpilly Passes. The latter is perfectly practicable for bandies. Leaving my baggage to go round by the Pass, I ascended the Ghauts by a sheep track, to the lead mines of Jungumanipenta, and descended to those of Buswapoor on the Western flank of the Ghauts. These mines have been previously described in a paper published by the Royal Asiatic Society. Suffice it here to observe, that the lower and modern elevations of the Ghauts are composed of slates and shales associated with the limestone; the highest ridges and peaks are capped and crested with sandstone passing into quartz rock. The limestone abounds with chert and hornstone; its shales are usually reddish, chocolate, green, white and ochreous, and interstratified with arenaceous, ferruginous, and calcareous bands passing into dark quartzose slates; petrographically speaking these resemble those of our Devonian series, but no traces of fossils are observed in any of these rocks.

Nundialempett. This village is situated about one and a quarter koss Westerly from the lead mines of Baswapur, and stands on the right bank

of a stream that flows from the neighbouring Ghauts southerly along their base into the Pennaur, called the Conda Nulla. On a ridge overlooking the tank stands the trigonometrical survey station of Mookandoo. The soil is alluvial and reddish, with calcareous matter intermixed, resting usually on a thick substratum of kunker imbedding nodular brown iron ore and fragments of the subjacent and adjacent rocks, viz. slaty argillaceous limestone and sandstone. The cultivation is solely of that description termed Moongari and garden. The aspect of the country at this western base of the Ghauts is at first undulating and picturesque, the undulations merging to the westward in the great *regur* plains of Dhoor and Cuddapah. The clumps and groves of shady tamarind trees, with which its surface is studded in the sub-ghaut plains, give it a park-like aspect. The ruins of a small fort, with the remains of a large cavalier in the centre, stand close to the village, and are said to have been built by one of the Cuddapah Nawabs.

Jummulmudgoo. Crossing the great plain of Dhoor, which is based on the diamond limestone, and divided by the Koond river, which runs Southerly down its centre to the Pennaur at Camlapoor, the large village of Jummulmudgoo is reached. It stands on the left bank of the Pennaur a little to the East of the emergence of this river from the gorge of the Gundicotta hills, which form the Western lip to the Pennaur basin, girt in on the South by the Wontimetta and Foolvaimla ranges, and to the East by the Eastern Ghauts, through which it escapes to the sea by the transverse break of Sidhout. The approximate height of this basin above the sea towards its centre, as indicated by the boiling point, is 800 feet.

The rock in the bed of the Pennaur and on which the village stands, is the blue variety of limestone above mentioned, often approaching French grey in lightness of colour; it dips slightly towards the E. or N. of E. The village is rather noted for the brilliancy and permanency of its dyes, which are fixed by washing and steeping the cotton printed cloths in a saline well, the water of which rises up from the limestone in the heart of the village. The surface of the water was thirty-two and a half feet below that of the ground, owing to the dry season; its temperature three feet below the surface 73° , a lowness ascribable to the constant evaporation caused on the surface and sides

by the washing and the drying of cloths. Temperature of air in the shade at 5 p. m. 85°. The principal saline ingredient, if I may judge from the incrustations in the fissures and seams from which the water springs, is muriate of soda. Many of the seams are occupied by a greyish friable earth consisting of disintegrated limestone mingled with this saline residue left after evaporation of the water.

There is another brackish well in the town, but it does not answer the purpose of the native dyers so well as this. The water of the other well is perfectly sweet. One which I visited between the saline spring and the river, lies at the depth of twenty-three feet from the surface, with a temperature of 75°, six and a half feet below the surface. The time has now passed when the occurrence of common salt, the mineral chloride of sodium of chemists, in distant regions was held to be sufficient evidence of the existence there of the new red sandstone. It occurs in the oldest stratified rocks of America, in the coal measures of England, the lias of Switzerland, and all over the hypogene and granitic area of South India.

Jummulmudgoo contains about 3,000 inhabitants, the greater portion of whom are Kunbis speaking Telinghi, a language which continues from Nellore to about the vicinity of Gooty and Kurnool, where it meets the Canarese of the Western provinces, and near Beder on the N. W. with the Mahratta. I found that it meets with the Tamul of Madras and the Southern provinces at Sriharicotta, a village about fifty miles North of Madras, near the old limits of the Andra-des, or Telinghi country, and the Dravidame-des. Jummulmudgoo was formerly a place of some importance under the Annagundi or Bijanugger princes, and the Chetvail rajahs. It subsequently shared the same fate as the rest of their dominions South of the Tumbuddra. It is the burial place of Sidi Miyan, brother of Halim Khan, Nuwab of Cuddapah in Hyder's time. Funeral rites in memory of him were performed during my encampment here. The remains of the *Diwan-khanah* and palace of the Cuddapah rulers, and a small fort without a ditch, still exist.

Pass of Gundicotta. Previous to describing the defile through which the Pennaur flows Easterly from the plain of Tarputri into that of Cuddapah, it will be right to mention that the ridge, through

which this transverse fissure occurs, commences a few miles South of Kurnool, on the S. bank of the Tumbuddra on the N. W., and runs Southerly through Dhone, and the Eastern borders of Banganpilly and Gooty by Munimudgoo, whence the direction is S. Easterly by Owk, W. of Ollavaconda, Juggernatgooda, the Timnainpetta tank, and Jummulmudgoo, to the hamlet of Cullamulla, about thirteen miles S. E. from Jummulmudgoo, and about fifteen miles from the fissure of Gundicotta.

The direct breadth of the range where intersected by the fissure is about five miles, and its extreme height apparently not more than 600 feet; the extreme height of the precipices on either side, ascertained trigonometrically, is not more than 250 feet, and often not more than 80 feet. The general direction is E. by N., though in its course through the hills it describes two salient and two re-entering angles. The bottom of the fissure is flattish, and occupied completely by the sandy bed of the Pennaur. The breadth is usually from 100 to 300 paces.

In Hamilton's account, taken from Heyne, Rennell, &c., the Pass of Gundicotta is described as a break or chasm in the mountains, which "appears to have resulted from some violent concussion of nature, as it is very narrow, and the opposite sides almost perpendicular." Induced by this description to suppose that some interesting dislocation of the strata on a large scale had taken place, I examined narrowly the sides of the Pass. Entering it with the Pennaur from the West, from the wide sandy waste caused by the confluence of the Chittravutty river with the former stream, the sides of the opening present steep slopes of sandstones thinly covered with a sandy soil and scattered bushes, among which frolicked troops of gay monkies. About the middle of the Pass, under the walls of the fortress of Gundicotta, which crown the Southern cliffs, the sides are precipitous masses of sandstone divided by fissures into vertical pinnacles, assimilating ruins, and which are occasionally undermined by the force of the monsoon freshes and precipitated into the bed of the river.

The sandstone strata forming the precipices on each side exhibit no marks of dislocation or violent disturbance. They dip at an angle

rarely above 10° towards the East and N. of E., and the undisturbed dip of the beds can be traced from one side to the other.

No ledges supporting beds of rolled pebbles could be found on the faces of the cliffs, or other marks of the rocks having been worn by watery erosion down to the present channel.

It is therefore reasonable to infer that this singular fissure has been mainly occasioned by contraction of the mass during consolidation, and not by "a violent convulsion of nature or erosion;" although there is little doubt that its width has been since increased and shape modified by the washing of the river floods, as is evident from the precipitated debris from the sides which occasionally strew the bed. Smaller parallel fissures are observable in the cliffs on each side, one of which has formed the cave called by the native guides, "*Pandi Gawi*."

The bed of the river is filled with sand and fragments of sandstone, and occasionally of its associated blue limestone, to so great a depth as to render an examination of the downward continuation of the fissure impracticable.

The great depression of the bottom of the fissure is clearly shown by the sudden manner in which the waters of the Pennaur are deflected into it from the S. E. course they were pursuing along the Western flank of the hills, and by the confluence of the Chittravutty at this point.

The river during the rains is said to rise to the height of seven or eight feet in the centre of the Pass.

The rock composing the cliffs is for the most part of a faint reddish, compact sandstone approaching quartz rock, in tabular masses of great thickness, though sometimes interstratified with argillaceous seams like the sandstones of Gokauk on the Gutpurba, which are usually of a reddish white and buffy colour.

The faces of the sandstone cliffs exhibit bands of a pale, green, red and white, which conform to the stratification.

The cliffs sustain a rocky table-land, the surface of which is frequently covered with a crust of laterite varying from a few inches to several feet in thickness, and which is also deposited in the fissures and seams of the subjacent sandstone.

The tabular surface of the latter rock, where denuded of this lateritic crust, is often divided into parallelograms by intersecting fissures and joints.

In some places nodular spheroidal concretions, about the size of a nutmeg, of quartz rock are seen imbedded in a mass of sandstone, around which the arenaceous particles of the rock are arranged in concentric bands of different shades, like those in agates. This concentric segregative structure is particularly observable in the more ferruginous portions of the rock.

Ripple marks are very common on the larger exposed surfaces of the sandstone strata. The table-land on the summit of the hills is a wild looking tract, covered with long grass and bush, which is burnt every year and produces good crops of turmeric.

Fortress of Gundicotta. The cliffs on the South of the Pass, and near its middle, are ascended at the ruins and tombs of Allahabad by a steep zigzag path to the once celebrated fortress begun by the Hindu sovereigns of Bijanugger, greatly enlarged by Aurungzebe's and Kutub Shah's famous General, Mir Jumlah, and added to by Hyder and Tippoo.

After the fall of Bijanugger in 1564, the fort was still retained by Nursing Raj, nephew of the slain Hindu monarch Ram Raj, from whom it was taken after a severe siege by Mahomed Kuli Kuttub Shah, king of Golconda, or rather by his General Mir Jumlah. It was subsequently annexed to the Patan government of Cuddapah by Neknam Khan, and afterwards given up to Hyder when he reduced this part of the Balaghat. It was ceded to the British by the treaty with the Nizam in 1800. The fortifications are extensive, and contain a handsome Chuhar Minar, military magazine, and mosque, a small town, and the ruins of a temple to Mahadeo; to whose shrine Ferishta tells us 100,000 Hindus of Bijanugger used to make an annual pilgrimage and offer gifts of great value. Besides the two paths by Allahabad are the other approaches to the fort, viz. one by an easy ascent from Jummulmudgoo on the East, and the other from Chittywanripilly by a steep and rugged ascent just practicable for horses.

Figure-stone quarries of Reddadoor. Proceeding Westerly from the Pass of Gundicotta, I passed along the plain on the left bank of the Chitravutty river to the hill pagoda of Reddadoor, nearly eight miles W. by S. from the base of the Gundicotta hills. Limestone, passing into argillaceous shales and schists, constitutes the rock in the plain. The ridge of Reddadoor is about a mile in length, running in an E. by S. direction: it consists of argillaceous slates alternating with a finely lami-

nated fissile shale of various shades of brown, chocolate, red, and yellow passing into a pure white. These rocks have a distinctly jointed structure: the joints are nearly vertical running in a S. W. direction. The planes of stratification are inclined at an angle of from 10° to 15° dipping towards E. 10° N.; they are easily distinguishable here from the smooth surfaces of cleavage by their dimpled and rippled superficies. The cleavage planes are also marked by dendritic delineations.

This ridge has been penetrated by a large dyke of basaltic greenstone, running nearly E. and W., and branching in a N. and S. direction. It is seen outcropping along the whole extent of the S. W. base. At the N. E. base both branches disappear in the plain. The basalt is also seen bursting through the strata at the saddle-shaped depression on the summit of the ridge, where it has both a globular and prismatic structure, the prisms pass into the globular form by the exfoliation of their angles, and I have even observed small spheroidal nuclei in the exfoliated coats, which are in turn subjected to concentric exfoliation. The dyke, like all others in this formation, does not overspread or cap the rocks on its sides, but ends abruptly at the surface. Towards the centre, like most volcanic dykes, it becomes crystalline and porphyritic, imbedding crystals of both whitish and pale green felspar with a few of hypersthene and foliated hornblende. Acicular augite is seen glistening in the more compact and quickest cooled parts of the dyke, and occasionally cubes of iron pyrites. The basalt melts easily into a greyish black glass.

The shale in contact, both in the plain and on the saddle of the ridge, is either hardened and rendered massive, compact or ferruginous, or is broken up, by crystalline forces apparently, into a number of laminæ often distinctly prismatic, and exhibiting dendritic marks on the planes into which they readily split. At the base of the hill the basalt and indurated shales assimilate so much at the junction line that it is difficult to distinguish them; the shale has become dark and hornblendic, and the basalt has acquired something of the fissile structure of the shale. A similar phenomenon is observed in the metamorphism of the hypogene rocks of Southern India, where the granite near the point of contact acquires the structure of gneiss, and the gneiss becomes in turn more granular, massive or granitoidal. The phenomena presented by granite and basaltic greenstone at their contact with metamorphic or other stratified rocks are extremely interesting;

and no country in the world, perhaps, affords better opportunities for their study than S. India. Some of the fissures of the dyke on the ridge of the hill are filled with calc spar, and many of the loose blocks encrusted with the same mineral and compact reddish kunker. Thin seams of nephrite occasionally intervene between the basalt and its walls; and the limestone associated with the slates has in some instances been converted into chert after assimilating calcedony in texture and colour.

Where basaltic greenstone and granite, or other plutonic rocks have extended on a great scale, we generally find not only a great tendency to crystalline and mineral development, but a segregation of the ordinary components of the rocks of the heated area, of such magnitude as to be at once apparent in the physical aspect of the country in large beds and ridges of quartz, iron ore, or quartz strongly impregnated with iron, felspathic clays, &c.

But to return. At the Southern base of the ridge the shales acquire a massive structure, and form a soft lilac tinted rock speckled with green, with a slightly soapy feel and easily sectile, which melts before the blow-pipe *per se* into a pearly glass. It is here quarried and carved into images, figures of deities, &c., which are exported.

I had a very neat representation of the Avatars of Vishnu, executed on a large slab of this material which, though I have given it the name of figure-stone, by no means resembles the agalmatolite of China, used for similar purposes.* Much of the water rising through the fissures of the rock around the base of the ridge is impregnated with muriate of soda; and further West to Ganlapaud the plain is intersected with trap dykes penetrating the grey limestone and its associated shales, which are often greatly altered and silicified. The general direction of the strata observed was E. S. E. and S. E. and dip N. of E. Hence, the plain to the base of the Rayelcherroo hills is chiefly limestone and associated shales and schists covered with *regur*. South of Rayelcherroo the limestone becomes of a waxy texture, compact, of a conchoidal fracture, veined and dotted with delicate shades of green, yellow, red, and imbeds pyrites. It rises into irregular hills and ridges, alternates with sandstone, and sandstone conglomerate. The hills become still more confused and jumbled, as the

* The Agalmatolite is wholly infusible. This is probably one of the many varieties of steatite.—Eps.

junction line with the granite is approached about six miles E. of Gooly, and the development of quartz is seen on the strange shaped peaks and mural ridges near the granite line. These hills, which form a most rugged and picturesque country, constitute the main and westernmost ridge of which the Gundicotta range just passed is a spur running down into the great plains of Tarputtri and Dhoor, and terminating abruptly as we have seen at Cullamulla, a few miles N. of the Travellers' bungalow at Chillumcoor.

These westernmost ridges instead of following the S. E. direction of the Gundicotta spur at the point of bifurcation between Banganpilly, Owk, Munimudgoo, and Piapully, continue their nearly N. and S. course from the banks of the Tumbuddra near Kurnool by Gooty to the vicinity of Anantapore in the Bellary district, whence they turn Easterly to the S. of Cuddapah, where they join the Eastern Ghauts; thus forming with the "impenetrable unsurveyed" spurs projecting westerly from the Eastern Ghauts along the S. bank of the Tumbuddra, to the North, the most complete basin perhaps in Southern India, embracing the great Regur plains of Cuddapah and Kurnool, and the beds of the Pennaur and its tributaries the Khoond and Chittravati. The Pennaur, which rises near Nundidroog, flowing Southerly from these watersheds of the elevated plateau of Mysore, is deflected suddenly by the great granitic outburst near Gooty from its farther course Northerly towards the Tumbuddra, which it would have certainly joined had not this rocky barrier compelled its stream to seek an Easterly course through the hilly edges and fertile plains of this sandstone-girt basin, to the Bay of Bengal. This basin and its rocky mountainous fringe, which consists chiefly of the diamond sandstone and limestone, comprehend the richest diamond mines of the former kingdom of Golconda, iron in great abundance, and the richest and almost only mines of galena in Southern India. It is composed for the most part of sandstone conglomerate, sandstone, arenaceous schists, limestone passing into silicious schists and into argillaceous schists, and shales of various shades, reddish brown, chocolate, and pale green prevailing. It was thought by Malcolmson, Heyne and others, that the formation consisted of the limestone underlying a sandstone and conglomerate imbedding the diamond. So far this is the case, but I have discovered on the Eastern limits from Juggernath S. of Kurnool to Gooty, and at Mudelaity

near Banganpilly, that beds of sandstone and sandstone conglomerate, reposing immediately on granite, underlie the limestone; and that the limestone must have been consolidated prior to the deposition upon it of the upper sandstone and its conglomerates, since in the latter I have found imbedded pebbles from the subjacent limestone. The formation, then, consists of an upper and lower sandstone and conglomerates, and the intervening limestone and associated shales.

Leaving this granite based chain, the great frontier plains of the Ceded Districts and Mysore are crossed to the hill fortresses of Rairdroog, and Chittledroog, where we find magnificent outbursts of granite and other plutonic rocks, rising abruptly and irregularly from the nearly vertical hypogene schists which have suffered every variety of flexure and disturbance.

Chundergooty Droog. The granite, on which stands the Droog or hill fort of Chundergooty, rises into two lofty peaks, the steepest sides of which are nearly parallel to those of the Western Ghauts, sloping off towards the East and South. The joints in the lower ranges of laminar granite, or granitoidal gneiss, are divided by vertical fissures giving them much the appearance of vertical strata, as remarked by Christie in his paper on the Geology of the South Mahratta country. The Droog, it is said, was built in the time of the Pandion kings, and strengthened by Hyder. The village in the base consists of about fifty houses under a Killadar, with twenty men. Coffee is cultivated at Sindli, a village about a koss distance, and iron, obtained from mines at a short distance, is exported hence to the West coast.

From Chundergooty to Siddapore, the road for the latter part lies over the undulating and hilly tracts on the slopes of the Western Ghauts, which gradually become more and more covered with wood. Granite, and the hypogene rocks, intersected by dykes of basaltic greenstone and overlaid occasionally by patches of laterite, are the only rocks observed. About three koss distance from Siddapore lies the ancient and decayed town of Bilghy, formerly the capital of the Santavi-roya Rajahs. Siddapore is now the Kusbah town of the talook. It contains between 200 and 300 houses, inhabited chiefly by Lingayats speaking Canarese, Concanis, Haiga Brahmins and Mussulmans. The staple articles of cultivation are rice, betel-nut, cardamoms, and black pepper. The three last are exported chiefly to Mysore, the Ceded Dis-

tricts, and other parts of the interior; and to the native port of Kompta on the Western coast, passing down the Gairsuppa or Hos-sulmucki Ghaut and the Hoss Ghaut, on bullocks. Iron is procured in the neighbouring hills.

Ridge of the Western Ghauts. Between Siddapore and the Falls of Gairsuppa, the highest edge of the Ghaut ridge is crossed; the watersheds of the table-lands to the Eastward, and of the mountain-streams that rush in the monsoon with great violence down their precipitous sides and across the narrow strip at their base into the Indian sea.

The Warda was the last stream of any size observed flowing Easterly. The Ghauts descend to the Westward from this anticlinal axis by short and steepish declivities and irregular terraces. The surface rock is principally a quartzzy lateritic conglomerate, overlying the hypogene schist, principally hornblende schist, gneiss, mica, chloritic, talcose, and actynolitic schists, which are occasionally seen bassetting out. The more ferruginous of these schists disintegrate into a compact red clay, in which are seen veins of quartz continued from the subjacent rocks, still maintaining their slope and direction.

The soil is red and clayey, and in the rains greasy and slippery in the extreme, owing probably to the decayed talc and mica; garnets abound in it.

Physical aspect W. Ghauts. As the Ghauts are approached from the plateau of Mysore, the flat plains begin to undulate, rising all the time to the Westward, and as the traveller progresses the undulations become shorter and more perceptible, till the highest ridge of the Pass is attained. The height of the rocks on either side of the path is generally concealed by forest.

The nature of the vegetation that clothes the surface too suffers a manifest change, and becomes more profuse. In place of the clumps of mangoes and tamarind, which diversify the plains with their hedges and thickets of Aloe, Euphorbia, Cacti, Acacia, Cassia, Parkinsonia? we see graceful clumps of bamboo, the broad-leaved *Bilami*, *Maræa Chinensis*, the leaves and root of which are supposed to be specifics for snake-bites, and the *Dudol* yielding excellent timber. The Pulas (*Butea Frondosa*) with its brilliant orange-red flowers yielding a beautiful yellow dye known to the preparers of the coloured

balls used in the festival of the Hooli, and its broad thick leaves which serve the Hindu as plates and dishes, the laurel-leaved Gorui (*Ixora parviflora*) which furnishes torches for the traveller. The Mutti tree (*Chuncoa Muttia*) the ashes of which, particularly the bark, containing much potash, are used instead of chunam, by betel-chewers: the tree also affords good timber. Here and there a magnificent banyan throws down its hundred arms, and the sacred Peepul rears its verdant head; while further in the jungle grows the sandal, supplying the fragrant oil and wood for which this part of the Ghauts is famous. The Sissoo (*Dalbergia*,) and *Terminalia alata*, excellent timber trees; the hard and lofty teak itself, and the *Hopea decandria*, the wood of which is harder and more durable even than that of the teak; the sago and areca palms, the jack, and the cashew nut. The wild cinnamon (*Cassia lignea*) grows in great abundance near the Falls, and the underwood glowed with the beautiful blossoms of the scarlet *Ixora*, sacred to Siva and Krishnu, while the air was redolent with the fragrance of the wild jasmine.

The vegetation of the Ghauts strongly reminded me, in its regular and smooth bust-like outline, of that which clothes the lovely and ever verdant Malayan Islands to the water's edge, similar loranthaceous parasites festoon the loftier trees of the forest, and the jungles abound with Myrtaceæ and Laurineæ. The *Ixoras* and *Eugenias* are common to both, and the cultivated forest clearings yield abundant supplies of black pepper, cardamoms, areca, coffee, plantains, &c.

Falls of Gairsuppa. Accompanied by my friend, Lient. White, 47th Regt., I arrived from Siddapore at the thatched bungalow of Korkunni, early in August, a little after midday. The bungalow stands in an open part of the forest, about one and a half mile from the Falls, the sound of which however did not yet reach us. Dripping with rain, our shoes full of blood from the jungle leeches that had fastened on our legs, and tolerably well fagged from a muddy march chiefly on foot over clayey and rocky ascents and descents, covered with dense thicket, we could not restrain our curiosity; but leaving our servants to prepare breakfast, with a guide trotting in front, we hastened towards the Falls along a narrow path winding through bush mixed with tall forest which clothes the banks of the *Sarawati*, for such is the name of the river that performs this stupendous lover's-leap

from the chains of the giant Ghauts into the arms of his ocean-rescued* Mistress—prolific Canara.

As we threaded the tortuous path, the rushing sounds of the rapids became clearly distinguishable from the shriller whistling of the wind, and the pattering of the rain among the leaves and branches of the trees.

On a nearer approach this rushing sound was suddenly drowned by the deep thunder, evidently of the Fall itself, which appeared to proceed from a great depth beneath the ground on which we walked, and which now was fairly felt to vibrate from the weighty shock. The air too became palpably colder, a phenomenon doubtless caused by the evaporation from the clouds of spray which canopy the Falls and adjacent banks.

Deceived by this sound, which still seemed afar off, into the imagination that the river was yet at a considerable distance, we unexpectedly emerged from the thicket upon the rapid immediately above the brink of the Falls, when the cause of this deception became evident; the din of the waters had been deadened by the peculiar shape, the immense depth, and confined dimensions of the chasm into which they were precipitated. Hence the ventriloquism of the cataract.

We now stood silent and astounded by the roar and rush:—amid the grey clouds of mist and spray the arrowy waters of the rapid were visible, divided into a multitude of currents by the rock masses against which they tumultuously dashed in their impetuous progress to the edge of the precipice.

Here, as the eye and ear follow its course to the main Fall, the rapid literally dies a sudden death; its clamorous voice is abruptly silenced, and it bodily disappears, as if by magic, in the bowels of the earth, or into the region of moving mist which curtained the chasm from the place we were standing on.

After indulging a short time in this magnificent spectacle—a gem set in lovely mountain and forest scenery—we scrambled over the muddy and slippery shelves of rock towards the edge of the principal Fall. The river was much swollen by the monsoon, but had been still fuller, as shown by the bruised and shattered forest trees which had

* The Brahmins have a tradition, that the sub-ghautine maritime tracts of the Western Coast were raised from the ocean for their especial use.

been uprooted, borne down, and thrown in confusion with other vegetable debris on the rocks we had to cross.

Crawling on hands and knees—an operation rendered eligible by the then slimy surface of the rock and the painful effects of a score of tumbles—we contrived to reach the shelf of rock which completely projects over the margin of the chasm, and forms an admirable point of view. We lay down flat on the surface of this shelf, which slopes gently from the chasm, and drew ourselves up to its edge over which, as I stretched my head, a sight burst on the view, which I shall never forget, and can never hope to describe. I have since looked down the fuming and sulphurous craters of Etna and Vesuvius, but have never experienced the sensations which overwhelmed me in the first downward gaze into this (Hibernice,) volcano of waters:—for so it looks.

All thoughts of the picturesque, all pre-formed resolutions of subduing the exaggerated impressions likely to be produced on the imagination by such a scene, and reducing them by the sober checks of calculation of height, depth, velocity, bulk, &c.—at once vanished, and left the mind partaking in the tumultuous confusion and agitation going on. But it is the chaotic scene beneath that rivets with basilisk fascination the gaze of the spectator, and produces in some minds the dangerous impulse or desire of self-precipitation.

This impulse originates possibly in a sympathy existing between the *human* Mind and what is termed, perhaps inaccurately, “Inanimate Nature,” which in its calm and beauteous state exercises so great a tranquilizing effect on certain minds.

Passive amid this activity, the spectator looks downwards into an apparently fathomless gulf of plunging waters, spray, uproar, and mist; first perhaps with a feeling of fear and giddiness, which rapidly vanishes, and the mind becomes not only reconciled to the incessancy and unvarying nature of these phenomena, but fascinated more or less by them. It was with great reluctance, and with an intense feeling of depression, that I withdrew my head drenched in spray from the brink of the precipice, to examine in detail other parts of the Falls. One might almost gaze for ever on this abyss in which a mighty mass of water appears eternally burying itself in a mist-shrouded grave. The clouds of spray which continually ascend heavenwards in slow and majestic wreaths, appear to typify the shadowy ghosts of the

entombed waters. The principal or Horse-shoe Fall is deeply located at the right bend of the ellipse formed by the entire chasm. Over it is precipitated the great bulk of the river, which fell over the edge with a smooth and graceful curve in one huge muddy mass, and descended in an unbroken sheet until lost to the eye in the volumes of spray below.

The Rocket Fall is on the left of the Horse-shoe, and, though insignificant in volume, is a cascade of extreme beauty, excelling those of Tivoli. This Fall after descending perpendicularly a great depth, encounters a projecting ledge of rock from which it glances with great velocity, whiteness, and brilliancy, forming in its descent the parabolic curve of a rocket, and sending off brilliant white jets resembling falling stars and tailed meteors.

The Roarer, so named from its noise, is nearer the Horse-shoe than the Rocket, and larger in volume; it descends in two streams upon a shelf of rock, down the highly inclined surface of which they rush with much noise and rapidity in one mingled mass of foam. In the dry weather no less than six or seven other Falls are distinguishable. I observed a number of small rills which, after descending some distance, separated into threads: these, in descending, became gradually divided into drops and spray, and mingled with the ascending wreaths of mist, apparently never reaching the bottom of the cataract.

In order to ascertain the height of the principal Fall, we let down a plummet attached to about 1000 feet of rope; but it got entangled near the bottom of the precipice, and broke in our exertions to draw it up. Mr. T. Lushington, of the Madras Civil Service, informs me, that he had successfully measured it in the dry season, and the result of these measurements were as follow:—

	Feet.
From the top of the Falls to the surface of } the water in the basin below, .. }	888
Depth of water in the basin,	300
Total,	1188 feet.

The sheet of water above the Falls was about 300 yards broad, (Mr. E. Maltby, of the Civil Service, informs me it is sometimes nearly 600 yards broad), and at least on average eight feet deep; current about six

or seven miles per hour. In the dry season it is scarcely knee-deep, and can be forded immediately above the Falls, with perfect safety, to the opposite bank, whence a path, partly hewn in the rock, leads to the basin and bed of the river below, impracticable or nearly so in the depth of the monsoon. There are many other cascades in Upper Canara seen glancing among the forest-clad heights of the Ghauts, but which are approachable with difficulty during the monsoon, for instance, those near Yellapoor, and Honeycomb, about three koss from Allawully.

To have a true estimate of the beauty of the Falls of Gairsuppa, they should be visited both during the monsoon, and when the water in the river is so low as to admit of their being viewed from below.

The rocks immediately beneath must present one of the most striking illustrations in the world of the eroding action of falling water, as proved by the immense depth of the basin. To these must be added the abrading effects of precipitated masses of rock. At the time of my visit not less than 43,000 cubic feet of water, by rough calculation, were falling per second into this vast rock basin.

The precipice, over which the water falls, affords a fine section of the gneiss and its associated hypogene schists, which dip Easterly and Northerly away from the Falls at an angle of about 35°. The gneiss is composed of quartz and felspar, with both mica and hornblende, and alternates with micaceous, talcose, actynolitic, chloritic and hornblende schists, imbedding (especially the latter) iron pyrites. These rocks are penetrated by veins of quartz and felspar, and also of a fine-grained granite composed of small grains of white felspar, quartz, and mica. Christie is of opinion, that this rock is not so old a granite as the ordinary granites of India, and that this is the only locality in India where he has met with primitive gneiss. No sound geological proof, however, is assigned for this opinion. All the granites of India are of posterior origin to the hypogene rocks, which they have invaded and altered. Regarding the age of the hypogene rocks themselves—always a most difficult problem to solve—we are still in the dark; nor does the fact of this granite being associated with the so-called “primitive gneiss,” lead us to infer an origin more recent than the ordinary granites of South India.

The mass of hypogene rocks has evidently been worn back several hundred feet by the erosion and abrasion of the cataract; the softer

talcoose and micaceous schists have suffered most. Mr. E. Maltby tells me, that an instance lately occurred of the manner in which the great Fall has receded. One of the crags composing the edge of the precipice gave way, and in its descent struck a projecting ledge of rock with so violent a concussion as to carry away a large extent of the face of the precipice. The whole mass fell into the basin below with a noise that startled the country for some miles around.

Rock basins are frequent in the bed of the river, which is worn in the rock, and rugged with water-worn rocky masses. The Falls of Gairsuppa may be justly ranked amongst the most magnificent cataracts of the globe. While excelled in height by the Cerosoli and Evanson cascades in the Alps,* and the Falls of the Arve in Savoy, the Gairsuppa cataract surpasses them in volume of water precipitated; and while much inferior to Niagara in volume, it far excels these celebrated Falls of the New World in height.

There are other picturesque falls and cascades in this part of the Ghauts: those most worth seeing are the cascades of Honeycoom, about three koss from Allawully, and those of Yellapoor. Farther North are the splendid Falls of the Yenna in the Mahabuleshwar hills, 600 feet high; and to the South those of the Cauvery, 300—viz., the Gunga Chakki 300 feet high, and the Burra Chakki, or Southern Fall, about 200 feet. Then come the Cascades of the Neilgherries, viz. those of Pykari, Kaiteer or Kulhattee, and the Elk cataract. The Falls of Courtallum in Tinnevely are about 220 feet high, and the sacred cataract of Pupanassum among the Ghauts of Travancore 160 feet high, and lastly, of the Falls of Komari near Cape Comorin. The mass of water precipitated over these Falls in the monsoon, and the amount of erosion and minor details are still desiderata. Many other Cascades exist in the Western Ghauts, of which there are no published accounts at all. Those of Gokauk I have already attempted to describe.

* The height of the Cerosoli Cascade is 2400 feet; that of Evanson, 1200 feet; and the Falls of the Arve, 1100 feet.

At Niagara a sheet of water, two miles across, is contracted to less than half its former breadth, and in the state of an impetuous rapid, running at the rate of seven or eight miles an hour, and about 25 feet in depth, is hurled over a projecting mass of horizontal limestone strata down a precipice 164 feet high, over which it falls in two great sheets into the basin below.

Western façade of the Ghauts. We now descended the Ghauts by the Hossulmakki Pass. Gneiss and its associated schists are seen as at Gairsuppa; but the gneiss is not so abundant.

These rocks are for the most part covered by a bed of red clay, sometimes fifteen feet thick; and on the summit of the Ghaut by laterite, in insulated beds and large dark coloured blocks. The laterite is almost wanting on the steepest descents, but is seen on the terraces which break the declivity, and again at a short distance from the base covering for the most part the lowlands of Canara to the sea at Honore.

Not far from the summit of the Ghauts two dykes of basaltic greenstone were crossed, running in a S. E. direction. The dip of the hypogene schists, which compose the great mass of the mountain chain, is irregular and confused, both on the descent and at the base.

The amount of dip varies from nearly vertical to horizontal, and the strata in many situations have suffered irregular flexures and contortions. One great mass of schists at the base dipped Westerly at an angle of 30° .

Base of the Western Ghauts. The gneiss and mica schists at the base of the Ghauts are veined with a pegmatite composed of white quartz, and flesh-coloured felspar, which is rather massive than schistose, and occasionally exhibits a tendency to assume the doubly oblique prismatic structure, or primary form of the latter mineral. Sometimes silvery white mica is seen segregated in this rock in very large rhombic prisms, capable of being divided, like the hemi-prismatic talc mica of Russia, called Muscovy glass, into extremely thin lamellæ.

The mica schist passes distinctly into a chloritic clay slate, and into reddish and variegated slate clays resembling those around Darwar in the South Mahratta country. The white and purplish varieties have the same soft, and obscurely slaty structure. These again, where exposed, rapidly assume the state of clay, under the heavy monsoon rains.

I observed several groupes of pinnacled columns, a foot or more in height, formed in these clays by the action of the heavy drops of rain falling from the high forest trees which shade them. On the top of each pinnacle was a small pebble, which explained the *modus operandi*.

These pebbles had been scattered over the surface of the clay, and had protected like a cap the portion of clay immediately under it from the downward washing action of these heavy drops, which had evidently worn away the intervening portions not similarly capped and protected. On removing the stone from the top of one of these columns, it was soon washed down by the heavy rain then falling.

Large veins of white, blackish and faint rose-coloured quartz associated with felspar, and imbedding large plates of silvery mica, are seen in the schists which in disintegration form a white earth with crimson dots and patches.

Town of Gairsuppa. A short distance Westerly from the base of the Ghauts, and about sixteen miles direct distance from the sea at Honore, stands the modern village or town of Gairsuppa, pleasantly situated on the left bank of the river to whose Falls it has given its name. It is shaded by a grove of tall cocoa-nut trees.

A little to the South of the present village lie the ruins of the ancient town which, under the rule of the Jaina Rajas of Ikery and Bednore, and the female dynasty of Baira-devi, is said to have contained a lac of habitations, and seventy-four Bastis or Jaina temples.

Although these traditions are not to be relied on implicitly, still there are marks of "Gairsuppa" having once been a place of considerable importance, as evident by the extent of the mounds and remains of walls enclosures, wells, &c. The remnants of five or six Jaina temples are still visible, in one of which stood the *Chatúr Mûki*, or four-faced idol of this sect.

It now comprises about fifty houses, inhabited principally by Sirigarras, a few Mahomedans, Conany Brahmins, and the low caste Halipaiks.

The Haiga Brahmins live chiefly on their own estates in houses scattered over the surface of the tract from which they derive their appellation of "Haiga," extending from Honore to Gokern.

From Gairsuppa to Honore. The face of the country from the town of Gairsuppa to Honore is diversified by hill and dale, well clothed with wood and thicket. The formation is chiefly laterite covering the hypogene schists, and forming long low ranges skirting the vallies, through which the Ghaut drainage finds its way to the sea, and flat-topped conical hills. Although the highest present freshes do not reach the base of the laterite cliffs which flank their banks, it is

evident that they must have done so at some more ancient epoch during the elevation of the Ghauts from the bed of the ocean. They present alternately salient and re-entering angles, precisely similar to those seen in the banks of a large river.

Honore. The fort of Honore, or more correctly Honawar, stands on high, flat-topped cliffs of laterite, the base of which is washed by the embouchure of the Sarawati or Gairsuppa river, which here forms an extensive back-water or lagoon, owing to its mouth being obstructed by a bar of sand. The channel is said to have shifted within the last fourteen years.

The embouchure to the N. E. is protected by a small projecting island. The river during the rains is navigable for native craft as far as Chendawar.

The remains of Tippoo's lines are still to be seen on the laterite cliffs to the E. N. E. The public buildings, bungalows of the civilians and military, occupy the top of the cliff on which the old fort stood, and of which nothing but the foundations are now visible.

The native town lies at the base of the cliffs, and contains between five and six hundred houses, inhabited principally by Concan Brahmins, Haiga Brahmins, Mussulmans, native Christians, Halipaiks, Gouras, and a few Jains.

The staple produce is rice, cocoa-nut, and betel-nut. Salt fish is exported in considerable quantity, and the Gurugars here are celebrated for their skill in carving the sandal-wood of the Ghauts into work-boxes, card-cases, desks, &c.

Honore was early a place of considerable traffic. The Portuguese erected a fort here in 1505 A. D., and Hyder a dockyard, for the purpose of building a navy.

It is now a small civil and military station, subordinate to Mangalore, the head-quarters of the Collectorate of Canara. The temperature of the river freshes here in the month of August, was 78°. Temperature of sea 76°. Of wells from 84 to 87°. The last, which is that of a spring called Ram Thert, is possibly thermal? Temperature of air in the shade at the time 81°. Off the mouth of the river is a bold picturesque islet, said to abound in iron ore.

On the bank of the river near its mouth and close to the water's edge, I found some rounded fragments of a cream-coloured fossil lime-

stone, which at first from their situation and rolled appearance, I thought had been transported from the Ghauts by the river freshes; but which, on farther enquiry, I found had been discharged as ballast by boatmen from the N. of Bombay, probably from Cutch.

Some of these fossils are evidently a species of nummulite; others have a singular spiral structure, and spherical globular form, of which my friend Captain Allardyce has favoured me with the following magnified drawings. (*See Fig., Diagrams 1 and 2.*)

Of these singular fossils, I shall give Captain Allardyce's description, instead of my own.

Description of Fig. 1.

This is a section of the fossil as it is most frequently seen: it shews little of the structure, except that it is convolute in this direction, which leads to the idea of its being a shell, and this a section across its axis or column.

Description of Fig. 2.

This is a section of the same shell in the direction of its column: the outer portion is an even fracture towards the centre tending to divide the shell equally; but the interior portion must be supposed raised and hemispherical, part of the crust having been removed to shew the structure.

The striæ are minute grooves, being the longitudinal sections of a set of capillary tubes that run spirally round the column in number amounting to 50 or 100 all abreast.

The transverse section of these tubes is seen in the last whorl near the circumference, where they are cut across, and appear in the shape of pores or holes. During each revolution the tubes terminate six or eight times in a general partition, which runs from one end of the column to the other; so that these partitions resemble the divisions of an orange or the valves of a capsule. The tubes can be nothing else than spiral cells, while instead of one as in other shells, there is a great number combined, and it appears as if the animal had been divided into many parts like the corals. The thickness of the crust, as compared with the diameter of the cells, is extraordinary; and in this respect also there is a resemblance to the corals and encrinites.

The exterior shape of the fossil is subglobose.

There is another organic form contained in this limestone, of which the following figure No. 3, will give an idea, and which I think may be the true transverse section of No. 2. It exhibits concentric lines of holes or pores, slightly depressed at the extremities, and generally three in number. (*See Fig., Diagram 3.*)

These fossils do not appear in the Cutch catalogue, or in other figured fossils of India that have fallen under my notice.

On the MERIS and ABORS of Assam. By Lieut. J. T. E. DALTON, Assistant Commissioner, Assam. In a letter to Major JENKINS. Communicated by the Government of India.

MY DEAR MAJOR,—I have this moment received yours of the 8th, for which many thanks. I fully intended sending you a supplemental paper, giving such information as I was able to collect regarding the Abors, their trade with the Meris, and communication with Thibet. The account I sent you was hurriedly written, and is, I know, very incomplete in many material points; but as a mere programme for the more ample narrative we may next year be, I hope, enabled to compile, it may not be necessary to add much to it at present.

The Customs, Language, Religion, &c. There is no very material difference between the Abors and Meris. They are evidently of common origin, and the Duphlas are of the same race. The Meris from their intercourse with the plains are, in some respects, more civilized, but almost all I have said concerning them applies equally to the tribes more remote. They intermarry with them, exchange slaves, and are generally in the habit of constant intercourse. The Meris, many of whom have become rich in cattle and goods, appreciate the value of combining for mutual support, and dwell in villages. The Abors, as they themselves say, are like tigers, two cannot dwell in one den; and I understand their houses are scattered singly or in groups of two and three over the immense extent of mountainous country occupied by them.

The Meris say, that whenever a few families of Abors have united into a society, fierce feuds about women and summary vengeance, or the

Fig 2

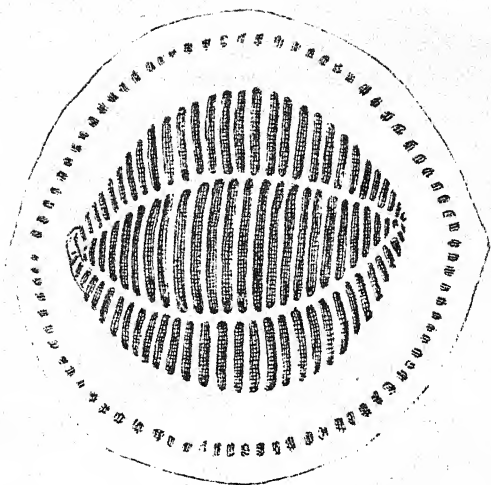


Fig 3

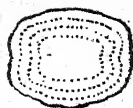
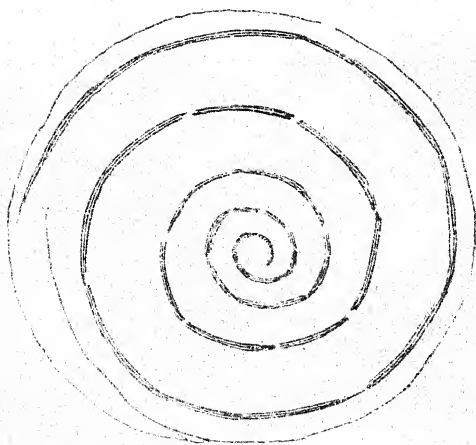
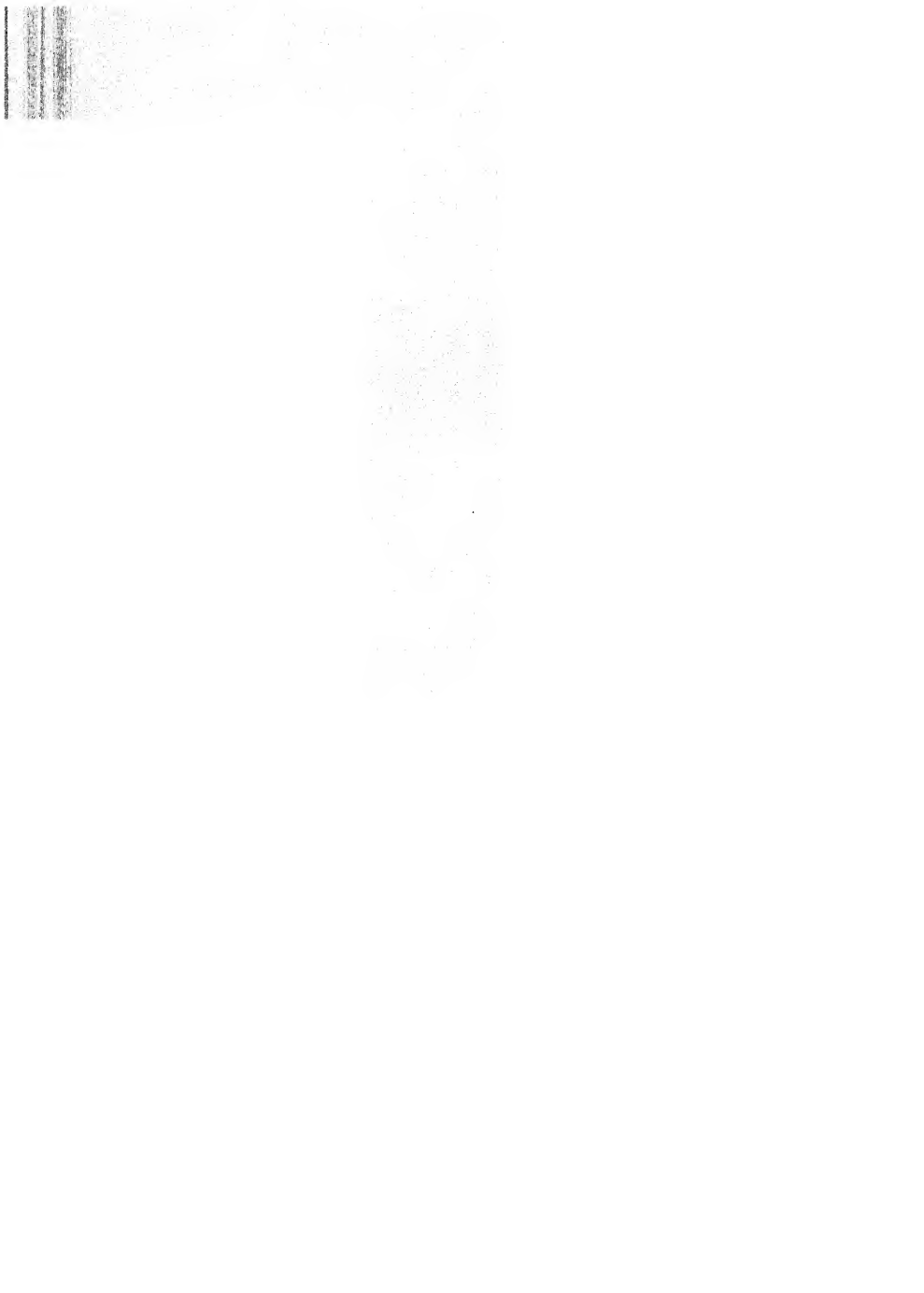


Fig 1



*Fossil bodies (magnified)
to illustrate Captain Newbold's paper.*



dread of it, soon breaks up or scatters the community. They therefore prefer building apart, and depending upon their own resources for maintaining themselves in their isolated positions. They are compelled to be more industrious than the Meris, and can fashion themselves daos and weave coarse cloth, arts of which the Meris are ignorant, or more correctly speaking, which they have lost. The iron for the former is, I believe, obtained from the other side, for I have not learnt that they understand the art of working the ore, and that which the Meris import from the plains they purchase ready made into daos for their own use.

The cotton used in the coarse cloths they weave is grown by themselves, very little of it ever finds its way down here; but I saw one load of it this year, and it appeared of excellent quality. Between the Abors and Meris there is a considerable trade. The Meris import from the Abor country munjeet, beads, daos, "Deo guntas" the little bells I have described in my former account, and cooking utensils of metal, Myttons, slaves, and I may say wives, their marriages being so entirely a matter of barter. In return for which the Abors take cloths of Assamese manufacture, salt or any articles imported by the Meris from Assam. Of the mode in which their intercourse with Thibet is carried on, I have as yet obtained very little information. I have never yet met with an Abor who had been across, and the Meris I have questioned on the subject assert they had not seen the tribes who are in direct communication; but from those who had seen them they had heard of a fine rich country inhabited by people who wore fine clothes, dwelt in stone houses, and rode on horses, which was watered by a mighty river. How ever they manage it, the Abors import from this country every thing above enumerated, save the munjeet, slaves, and wives that they interchange with the Meris. The large metal dishes thus imported are of superior manufacture, and fetch high prices when brought in here by the Meris. The Meris possess cooking vessels of great size so obtained, which they use at their feasts, but are very jealous of producing before strangers. The daos are of superior temper, but of rude finish, and of the workmanship, as I believe, of Thibetan blacksmiths; they are probably made in the rough for the express purpose of barter with these people, as they are made in Luckimpore for the Meris. In addition to the articles I have enumerated, the Abors import salt (from the description given of it rock salt) from the north, for it appears they

have a very scanty supply of it, and gladly take our salt from the Meris when they can get it. I presume it to be an importation : what they export in return I know not, but most likely cotton and munjeet. Between the Duphla and Meris countries there is a tribe called " Auks" and " Auka Meris" by the Assamese, who never visit the plains, but yet appear, from all I have been able to glean regarding them, very superior to the tribes of this family we are acquainted with. Surrounded by lofty mountains, the country they inhabit is an extensive valley, represented as being perfectly level, and watered by a branch or perhaps the principal stream of the Soondree, and richly cultivated. They are said to possess fifteen large villages, the cultivation of one adjoining that of the other, so that there is no waste land between. Their chief cultivation and sole staple appears to be rice, to rear which they irrigate the land, and are said to have magnificent crops in return. Their lands are not, I am told, adapted to the cultivation of cotton, but they procure as much of it as they require from the Abors in exchange for rice. In industry and art they are acknowledged by the Meris to be very much *their* superiors, who however, perhaps for this very reason, look upon the Aukas as their inferiors in the scale of creation. The Auka ladies wear blue or black petticoats, and jackets of white cotton of their own manufacture : their faces are tatooed "*unde nomen*" Auka, which is given to them by the Assamese. They call themselves " Tenae." The males do not rejoice in much drapery ; they wear a girdle of cane-work painted red, which hangs down behind in a long bushy tail I am told, and must have a comical effect. Of their religion all I have heard is, that every fourth year there is a kind of religious jubilee devoted to sacrificing and feasting at the different villages by turns ; and on these occasions, some one officiates as priest : other particulars in which they differ from the Meris have been related to me. The Meris, however extensive the family and the number of married couples it includes, all occupy one house. The young men of the Tenae tribe when they marry leave their fathers' house, and set up for themselves. During the Moamorya troubles many of the Assamese of this division are said to have sought and found in the Tenae valley a refuge from the persecutions of that sect, the refugees appear to have been generously treated, and no obstacles were opposed to their return to their own country when the dangers that threatened them were removed ; but I have sometimes heard that a few

remained of their own free-will, who settled in the valley, and are still to be found there.

The Tenae appear to be a very peaceably disposed people, but they occasionally are compelled to take up arms to punish marauding Abors, and they are said to do the business at once effectually and honorably, whilst the Meris and Abors confine their warfare to nocturnal and secret attacks, and, if successful in effecting a surprise, indiscriminately massacre men, women, and children. The Tenae declare hostilities, march openly to attack their enemy, and make war only on men, and their revenge does not extend beyond the simple attainment of their object in taking up arms. If this be true, it places them in a high rank, as a humane people, amongst our Mountain tribes. Tema is my authority for both assertions, humiliating as it should have been to him, and honorable to them; but he made the confession of the Meri mode of waging war without any remorse of conscience.

Assured that a more particular and better authenticated account of a people so sequestered and peculiar, would be interesting, I would, if permitted, next cold season make every effort to visit them, in the manner least calculated to excite jealousy or alarm. Their country is most easily accessible from the Duphla Door; but I am not yet well acquainted with this tribe, and am not prepared to say that it would be safe to attempt a passage through their country without a strong guard, which would defeat my object entirely; and having, I think, secured the good-will of the Meris, I would prefer their route, though said to possess more natural difficulties; ascending the Soobanshiri as before to Siploo Ghaut, I propose, after having paid Tema's country a second visit and explored such of the Sowrock country as lies on this side of the Soobanshiri, to proceed to the Turbotheah villages. The Turbotheah have promised to assist me in every way from Tema's village to their own, and as the Aukas or Tenae are only two good marches from the Turbotheah Meris, I should hope to be able to make amicable arrangements with them and the intervening Abors to permit me to proceed in safety to their valley.

I cannot hold out any very sanguine expectations of being able to penetrate so far as to behold Thibet from the mountain tops, or to gain much knowledge of that country; but without crossing the snowy range there is a vast extent of interesting country to explore, and if Mr.

Masters agrees to accompany me, we may pick up much worth knowing. I am sorry I was unable to send you a sketch of my late route. I wrote to Mr. Hornton, for a surveyor and the loan of a compass for myself, but unfortunately my letter did not find him at home, and I did not receive his answer till after my return. I had made my arrangements, and could not wait. I send you herewith a very rough ideal sketch, (published at p. 226) the ill execution of which I hope you will excuse, as I am very much hurried.

This time next year I hope to be able to propose an excursion to explore the Duphlas country. I had an interview yesterday with a considerable number of them, those for whom the salt has been sanctioned; and having concluded the business of the day, I had an amicable talk with them, and, on the question of a visit being started, they made no demur.

Luckimpore, the 23rd March, 1845.

Notice of some Unpublished Coins of the Indo-Scythians. By Lieutenant ALEXANDER CUNNINGHAM, Engineers.

In the accompanying plate are exhibited the small silver disc which was extracted from the Manikyala Tope by General Ventura, and several new coins of the Indo-Scythians, some of which are highly interesting from their undoubted Baudhdha figures, emblems, and inscriptions. These coins afford the last links in the chain of evidence to prove the identity of the Indo-Scythian KANERKI, with the Buddhist prince KANISHKA of Kashmir, as was conjectured by Mr. James Prinsep, so far back as 1833.

No. 1.—A thin piece of silver inscribed with an Ariano-Pali legend in two lines. In this short inscription, as in all the Tope inscriptions yet found, the letters are of a cursive and less decided form than those of the coins. Many of them are of course easily distinguishable; but there are others which bear no resemblance whatever to any of the letters found on the coins; and yet they can scarcely be new characters, as I believe that I have found the Ariano-Pali equivalent for every letter of the Sanskrit alphabet. Some of them may be new forms of known characters, and others are no doubt compound letters which may

possibly baffle us for a long time. The chief difficulty, however, lies in the loose and cursive manner of the writing, in which many letters of similar forms are represented by characters of the same shape.

In the present short inscription the only doubtful letters are in the lower line. The upper line reads simply *Gomangasa*, "of the anointed body (or limb)," from गोम *gom*, to anoint, and अंग *angga*, the body (or a member of it). In the lower line the first letter on the right is certainly *k*, (I write with two electro-type facsimiles of the original lying before me); the second looks more like *n* than any other letter; the third is *t*; the fourth is *tu* or *to*, according to my alphabet; and the last is clearly *s*: thus forming *kanatatusa*, which is the Pali form of the Sanskrit *kanyatratora*, "the supporter or cherisher of maidens." The whole inscription is therefore *Gomangasa kanatatusa*, "(Stupa or Tope) of the anointed body of Kanyatratora."

The gold coins extracted from this Tope by General Ventura declare, in my opinion, most unquestionably, the age of the monument. They belong to OHPKI or Hoerki, whom I identify with Hushka, a Tartar sovereign of Kashmir just before the beginning of the Christian era. In General Court's inscription the Tartar prince Kanishka is mentioned with the title of Maharaja; and this title is also found in a second cylinder inscription. From these instances I infer, that when a tope was erected over a royal personage, his royal titles were inserted; and that in the absence of any title, we may judge that the tope was built over either a relic of Buddha, or the ashes of some eminent follower. Bhagawa himself particularly mentions the merits to be acquired from building *thupa* (topes) over relics of *Sawaka* or *Chakkawati Rajas*. In the present instance therefore I believe that the great Manikyala tope was built over a *Sawaka* (Sanskrit *Srawaka*) or lay votary of Buddha, named Kanyatratora; and that General Court's smaller tope was built over the relics of Kanishka himself.

I can find no authority for the erection of topes over the relics of the Buddhist priesthood, although we possess the names of no less than twenty-seven of the chief priests or patriarchs of the Buddhists, from the death of Sakya Sinha to A. D. 499. I find that in B. C. 62 to 28, the patriarch of Western India was named Kia-na-shi-pho, probably *Kanya-sibha*, "the praiser of maidens." There is some similarity between this name and that of *Kanyatratora*, "the cherisher of maidens;" but in the

absence of all authority showing that *stupas* were erected over the priesthood, it is impossible to insist upon the identity of the two persons.

In support of the values which I have given to two of the letters in this inscription, I must refer to other inscriptions in which these letters are found. The first of them, which I have read as *ṅ*, in *Goman-gasa*, occurs in Ventura's Manikyala cylinder inscription, in what is most likely the name of the father of Kanyatrata. That inscription I read as follows :

Swati-Siri-Munipasa-Gangaphuka-Munipa-putasa.

Swati Siri is the Sanskrit *Swasti Sri*, an auspicious invocation of very common occurrence in the beginning of inscriptions even at the present day. *Muni* is a holy personage, with the affix of *pa*, usually given to holy men ; for instance *Gwali*, after whom *Gwali awara* (Gwalior) is named, is invariably called Gwalipa. *Gangaphuka* means " the bird of the Ganges ;" and the whole legend is " All hail ! (Tope) of the Muni, the son of Gangaphuka Muni." This of course refers to Kanyatrata Muni ; and indeed the very name of Manikiyala points to the same conclusion ; *Muni-ka-alaya* being " the place of the Muni."* Another Muni is mentioned in Court's Manikyala inscription as well as the Maharaja Kanishka.

The same letter occurs again in the legends of the Kozola-Kadaphes, and Kozonlo-Kadphizes coins. The native legends of these coins are, with one or two slight variations, identical. That of Kozola-Kadaphes which has on the Greek side ΖΑΘΟΥ ΚΟΖΟΛΑ ΚΑΔΑΦΕC ΧΟΡΑΝCΥ, reads

Khushangasa Yatugasa Kujula Kasasa, &c.

that of Kozonlo-Kadphizes, which has on the Greek side ΚΟΖΟΥΛΟ ΚΑΔΦΙΖΟΥ ΚΟΡC or ΚΟΡCΟ, reads

Kushangasa Yatugasa Kujula Kasasa, &c.

which I interpret as " (Coin) of the king of the Kuei-shang, Kozola-Kadaphes." We know that the Kuei-shang were one of the five tribes of the Great Yu-chi, which tribe I identify with the Asiani, one of the people

* Another derivation may be from *Mani*, a gem : *Mani-ki-alaya*, " the place or receptacle of the gem or relic."

that overthrew the Bactrian Greek kingdom. ΖΑΘΟC, I suppose to be only the Greek rendering of the Zend *khshathra*, king, of which we possess no less than four other readings, namely: *Ξατρης*, *Ξααρτης*, *Ξαρτης*, and *Ξαθρης*; the last of which is almost the same as the ΖΑΘΟC of our coins. The Kuei-shang tribe occupied a city to the south of So-mo-ki-an, or Samarkand, called Kuei-shwang-nā, which name is still preserved in the modern Kesh, the birth-place of Timur. It is called Kashāniyah by Abulfeda.

Another tribe of the Great Yuchi were the Shwang-mi, who occupied the country called Shang-mi to the south of Wakhan and of the Great Mountains, which must be the modern Chitral and Mastuj.

A third tribe, the Hieu-mi, occupied the country on the Upper Oxus, or Wakhan. They gave their name to their capital, which was called Ho-mé; and from them, I believe, the river Oxus to have taken its name of Amú, because it rose in the country of the Hieu-mi. The Shakh river gave its name to Shakhnan, and the Waksh or Wakh river gave its name to Wakhan. Waksh, or Oksh *وکش*, must have been the name from which the Greeks made Oxus.

The Hieu-mi tribe had at least one powerful monarch in the second Kadphises, who is called ΟΟΗΜΟ on all his coins; a name which the French *Savans* MM. R. Rochette and Jacquet curiously divided, giving one-half to Kadphises, whom they called Mokadphises, and leaving the other half to stand upon its own responsibility.

The character which I have read as *tu* or *to* occurs in the legend of the coins of this Kadphises, which I read somewhat differently from Mr. Prinsep, he having been misled by giving an erroneous value to the letter *g*,* which he read as *ph*. The whole legend, according to my alphabet, is, '*Maharajasa Rajadirajasa Sabatugahi-Surasa Mahi-Surasa Hima Ka-*

* It is now nearly four years since I corrected this error from the legends of the coins of Gondophares, and his nephew Abdagases. On the coins of the latter the Greek legend is ΒΑΣΙΛ ΥΑΣΙΑ ΥΝΔΙΦΕΡΩ ΑΔΕΛΦΙΔΕΩC, and the native legend is "*Maharajasa tadarasa Abdagasasa Gondophara bhata-putasa*," "(Coin) of the great King, the preserver, Abdagases, Gondophara's-brother's-son." Here we have *bhata-puta*, the *literal* translation of the Greek ΑΔΕΛΦΙΔΕΩC. The Kashmiris still say *Bhai-putr*. The letter *g* occurs also in the native transcript of the Greek Στρατηγος which is rendered in Pali *Thategasa*. The whole legend is "*Aspavatasa Thategasa jayatas Indavatiputasa*," "(Coin) of the General Aspabates, the victorious, the son of Indrabates." Aspabates was the General of Azas. His coins are found in the Western Panjab.

phisasa Tatasa, " (Coin) of the great King, the " King of kings, the every-where-destroying-hero, the hero-of-the-world, (of the tribe of) Hieu-mi, ΚΑΡΗΣΙΣ, the preserver." On one well preserved coin the letter *hi* is omitted in the middle of the inscription, which, if intentional, simplifies the third title to '*Sabatoga-Surasa,*' " the all-pervading hero." *Sabatu* is the regular Pali-form of the Sanscrit *Sarvvatra*, everywhere, in all places.

The coins which I am now about to describe, with the single exception of No. 4, have all been in my own possession. My gold coins have passed into the hands of Sir Herbert Maddock; but I still retain perfect impressions of them both in lead and sealing-wax. Figs. 2, 3 and 4 are unique; fig. 5 is not uncommon; but finely preserved specimens, such as the one now published, are extremely rare. Fig. 6 is unique. Of Fig. 7, I have seen only three specimens; one of smaller size in Mr. James Prinsep's cabinet; a specimen in my own possession from the Kabul valley; and the coin now published, which was amongst those extracted by General Ventura from the Manikyala Tope, and is now in my cabinet. Fig. 8, is common; but good specimens are very rare. Figs. 9, 10 and 11 are all rare: the last is the rarest, and the first the least rare.

No. 2.—A round gold coin, weighing 122 grains, of very good make, and in excellent order.

Obverse. Half length figure of the king inclined to the left; the head encircled by a halo, and dressed in a highly ornamented tiara: flames issue from his shoulders; his left hand grasps a sceptre, and in his upraised right hand he holds before him a cylindrical object by a handle below. His dress consists of an under robe fastened down the middle, and an upper garment open in front, with loose sleeves, and adorned with necklaces and armlets. Inscription around the piece in barbarous Greek characters PAO NANO PAO O (ηρκι) KOPANO, "The King of kings, ΗΟΕΚΙ, Koran."

Reverse. A full length winged female figure, dressed in an upper garment with short sleeves, and in a long under robe reaching to her feet: she carries a trident, or perhaps an elongated cornucopia in her left hand, and in her right she holds out a chaplet. In the field to the right is the usual monograph of the Indo-Scythian coins; and to the left in bad Greek characters the legend CAMI (or OANI) MAO; the whole ornamented by a dotted circle.

The figure on the reverse of this piece is very like that of Victory on the coins of Menander, Azas, and Undopherras; and it has also a striking resemblance to the *Ardokro*, depicted in No. 10 of the accompanying plate. But the legend appears to be *Vami Mao*, which, if intended for the Sanscrit **वामा**, *Vama*, a woman, may be translated as "the female Moon," or Chandri, the consort of Surya or the Sun. For the Moon is an Androgynal deity; being male or the god Chandra, when in opposition to the Sun, and becoming female or the goddess Chandri, when in conjunction with the Sun. If the legend should be *Vani Mao*, the interpretation will then perhaps denote some identification of the Moon with the goddess *Saraswati*, who as **वाणी**, *Vani*, was the goddess of Science and Learning, and who, as the consort of the Sun, became the mother of the river Jumna. **वह्नी**, *Vahni*, fire, can scarcely be coupled with Mao, the Moon.

No. 3.—A round gold coin, weighing 125 grains, of good make, and in fair order.

Obverse. Essentially the same as that of the coin just described, excepting that the left hand of the king is apparently empty, and that the ends of a diadem are seen floating behind his head. Legend in bad Greek characters, almost illegible from faulty striking, but probably the same as the last.

Reverse. A full length male figure to the left, clothed in a long sleeved dress, with a loose robe flowing behind; the head surrounded by a radiated halo; the right arm extended to the right, and the left hand resting on the hip. In the field to the left the common Indo-Scythian monograph; and to the right in bad Greek letters the legend OM BOΔ, or perhaps OΔI BOΔ; either *Aum Buddha*, or *Adi Buddha*; the BOΔ being most probably a contraction of BOΔYΑΣ, which was one of the several Greek renderings of the name of Buddha.

On both of these coins, the instrument, which the prince holds in his right hand, resembles exactly the praying cylinder which is used by all Lamas of the present day. It is called *Muni* by the Bhotias, and *Skoru* by the Tibetans. I have one now lying before me, which I procured from a Lama near Triloknath on the *Chandrabhaga* river. It is a thin cylinder of brass, three inches long, and two inches and a half in diameter, filled with a long paper roll of writing, which, I was told, contained only prayers. By a gentle motion of the hand it is kept continually re-

volved upon its axis, which, being prolonged below, forms the handle of the instrument. The motion is assisted and regulated by a small octagonal piece of iron fastened by a short chain to the side of the cylinder.

Moorcroft saw one of these mechanical prayer-mills, of a large size, turned by water, which probably performed the prayers of a whole village, while the inhabitants were at work in their fields. Every Lama carries a *Skoru* or *Muni*; and if these Indo-Scythian kings had spiritual as well as temporal authority, as the flames issuing from their shoulders would seem to show, (Mahawanso, p. 27.) no instrument could be more appropriately put in their hands than the praying cylinder.

A common expression in Buddhist writings is "turning the wheel of the law;" and in the 7th volume of the Asiatic Society's Journal, p. 147, M. Csoma states, on Buddhistical authority, that the 8th general principle for the conduct of a zealous Buddhist is "to exhort all Buddhas to turn the 'wheel of religion.'" Now I would suggest that this "wheel of the law," or "wheel of religion," (*dharmma-chakra*) may be only the praying cylinder; and that to turn the wheel of the law meant *literally* to turn the prayer cylinder; and *figuratively* to make religion advance. This interpretation, which would prove, beyond all doubt, that these princes were of the Buddhist religion, is I think fully borne out by the Buddhistical version which I have given to the reverse legend of No. 3, and by the Buddhistical figures and legends on the reverses of Nos. 6 and 7.

No. 4.—A round gold coin, of beautiful make, and in excellent preservation. This piece belonged to the collection of my much lamented friend, the late Dr. Lord; and it is now, I believe, in the museum of the East India House.

Obverse. A full length male figure to the left, apparently dressed in a complete suit of chain armor; the head encircled by a halo, and covered by a helmet, having long flaps which protect the ears;—the left hand raised and holding a trident, and the right hand pointing downwards to an undecided object, which may probably be only a cylinder similar to those found in the Topes; or it may be a small Stupa itself, as it is surmounted by a trident. In either case it would be an object held sacred as containing a relic of Buddha. Legend in bad Greek characters around the piece PAO NANO PAO BAAANO KOPANO, "The King of kings, BALANUS (or BALA,) Koran.

Reverse. A three-headed full length figure to the right, standing before a bull, which has a bell hanging from its neck; the figure clad in the Indian *dhoti*, and wearing the sacred string of the superior castes; and holding out in his three hands, three different objects, one of which looks like a noose. The Indo-Scythian monograph over the bull's head; and to the left in bad Greek letters the word OKPO, which Professor Lassen has happily explained by *Ugra*, one of the many names of Siva; the whole surrounded by a dotted circle.

This figure is, I believe, the personification of Siva, under his triple form; the same in which he is sculptured in the caves of Elephanta and Ellora; one head representing the destroying power, and the other heads the *two creative powers*, male and female, or Siva and Parvati, behind whom stands the sacred bull Nandi. On the coin before us there are but three arms; although the triple headed busts of Siva have six arms: the other three arms have been omitted merely from want of space.

On this coin we have an entirely new name added to our Indo-Scythian list. In the annexed sketch it is but faintly traceable, as the lithographer has failed in faithfully representing my sketch: but I may mention that the first two letters are distinctly BA; the third is A or Δ, and the last three are ANO or perhaps AMO: thus forming either BAAANO or BAΔANO. That the former is the true reading is, I think, almost confirmed by the following fact. The author of the *Raja Tarangini* in mentioning the cause of quarrel between the *Raja Hiranya*, and his younger brother *Toramana*, the *Yuva Raja*, states that *Toramana*, having melted down the ancient coin of the country called *Balahats*, framed *Dinars* in his own name. Now *Bala-hat* means simply "the mintage of *Bala*," who must therefore have been a former ruler of Kashmir; and was most probably this very *Balan*, whose name we have just discovered for the first time upon a coin. For I contend that *Balan* or *Balano* or *Balanus*, who is clearly from the make of his coin of the same family as *Kanerki*, was equally with him a king of Kashmir, and perhaps prior even to *Kanerki*; as this single coin is decidedly superior in execution to that of many of the *Kanerki* coins which I have seen. But Mr. Prinsep's engravings of the *Kanerki* gold coins exhibit several pieces of apparently the same beauty of workmanship; and therefore I shall be content for the present with ranging *Balan* in the series of Indo-Scythian princes immediately following *Kanerki*.

No. 5.—A round copper coin, of large size, of beautiful make, and in more perfect preservation than any other Indo-Scythian copper coin that I have seen.

Obverse. Full length figure of the king to the left, bearded; his head covered with a curious cap having a brim or peak to the front; and the ends of a diadem floating behind. He is dressed in a long coat, under which his trousers appear, and over which a loose robe falls behind in circular folds. His left hand grasps a spear or trident, and his right hand is pointed downwards over the same object which is seen on the obverse of No. 4. Legend in corrupted Greek characters: PAO KANHPKI, "king KANERKI."

Reverse. A radiated and bearded figure, running quickly to the left; dressed only in a pair of very short tight drawers, and holding up with both hands a large loose robe or cloak, which falls in circular folds behind him. To the left is the Indo-Scythian monograph; and to the right in bad Greek characters the word OAAO; which Professor Lassen was the first to explain very happily by *Vado*; Sanskrit *Vata*, Zend *Vato*, and modern Persian *Bâd*, or "the wind;" which is represented running more or less quickly on different coins. The coins of this type in copper are of three sizes; large, middle, and small.

No. 6.—A round copper coin, of large size, and uncommon thickness; of very good make, and in tolerable preservation.

Obverse. Exactly the same as the preceding.

Reverse. A figure seated in the Oriental fashion; the hair dressed in a knot on the top of the head, which is encircled by a halo formed of dots; the ears either elongated after the manner of Buddhist sculptures, or adorned with jewels; the left hand resting upon the feet, and the right hand, with fingers extended, placed opposite the breast, in a manner peculiar to Buddhist figures, and more particularly to Amogha Siddha, one of the five celestial Buddhas. Amogha Siddha is also a title of Adi Buddha himself. Monograph to the left: and legend around the piece in corrupted Greek characters, O BOAA CAM; which I think may be intended for OM BOΔA CAMANA or *Aum Buddha Sramana*. I do not by any means insist upon the correctness of this reading; but it is a highly probable one, from its being placed around an eminently characteristic Bauddha figure.

No. 7.—A round copper coin, of large size, thickly coated with indurated verdigris. This piece is one of those extracted by General Ventura from the Manikyala Tope, and which I obtained in exchange from Mr. Prinsep.

Obverse. Similar to Nos. 5 and 6.

Reverse. A full length figure standing to the front, and clad in a long dress: the head surrounded by a circular halo; and the hands raised together before the breast in an attitude, which is peculiar to the figures of Samant Bhadra, the first of the celestial Bodhisatwas. Samant Bhadra is also one of the names of Adi Buddha, (see Hodgson's Trans. R. A. Soc. 2, p. 239.) The monograph to the left: and legend in corrupted Greek characters, ~ O AΔO BOΔ CAMA A similar copper coin, of middle size, is figured in the Asiatic Society's Journal, (vol. 3, pl. 25, fig. 11,) on which the legend, as given by Mr. Prinsep, is OΔYΘ BOY CAKANA. By a comparison of the two legends, I am inclined to read them either as *Aum Adi Buddha Sramana*, or simply as *Adi Buddha Sramana*. The first letter, which Prinsep read as O, has on this coin a turn to the left, which identifies it with the peculiar flourish, which is found at the commencement of many ancient inscriptions, and which is generally allowed to stand for the sacred unutterable syllable *Aum*. Of the letters to the left, the first four only are preserved upon the present coin: but they agree generally with those on Mr. Prinsep's engraved specimen. The first letter on both is C, and not Λ, as Professor Lassen has made it with some hesitation, and the last two letters on Mr. Prinsep's coin are NA: consequently we have altogether CAMANA for *Sramana*, 'an ascetic,' which is a common appellation of Buddha, and was well known to the Greeks as ZAP-MANOS or ΣΕΜΝΟΣ.

No. 8.—A round copper coin, of large size, of good make, and in good order.

Obverse. A male figure mounted on an elephant, moving to the right. Legend in corrupt Greek characters around the piece, PAO (*vavo*) PAO KENOPANO "the King of kings, KENORANO."

Reverse. A full length male figure, dressed in flowing garments; with the right hand raised, and the left hand resting on the hip. Behind his shoulders a large lunar crescent. Legend to the right, MAO 'the Moon'; and to the left the usual Indo-Scythian monograph.

No. 9.—A round copper coin, of middle size, of good make, and in good order.

Obverse. The same as No. 8.

Reverse. A full length female figure to the right, clad in a long robe, with a short tunic reaching to the waist; the left hand supporting a cornucopia, and the right resting on the hip; the head covered, and surrounded by a halo. Corrupt Greek legend to the left, ΑΡΔΟΧΡΟ; to the right, the usual Indo-Scythian monograph.

No. 10.—Essentially the same as the preceding; but the figure is looking to the left, and holding out a wreath in the out-stretched right hand.

No. 11.—Precisely the same as No. 9; but the figure faces to the left.

The title of KOPANO on these Indo-Scythian coins, which follows the names of KADAPHES, OERKI and KANERKI, has not yet been satisfactorily explained. It certainly cannot mean king, as we have *Zatlos* on the coins of Kadaphes, and *Rao-Nano-Rao* on the coins of his successors. In a paper on the coinage of Kashmir published in the Numismatic Chronicle of London in 1843, I suggested that it was derived from the Greek ΚΟΡΩΝΙΣ, *with curling horns*; and that the Arabic *Zul-karnain* pointed to that derivation. In this sense *Koran* would mean Alexander the Great; and the Princes who take that title would claim descent from Zul-karnain. XOPAN CV and KOPCO might then stand for KOPANου Συγγενους, "the kinsman of Koran;" and this interpretation offers a plausible reading for the Greek legend of the earlier coins of Kozonlo Kadphizes, on which we find ΒΑΣΙΛΕΩΣ ΣΤΗΡΟΣ ΣΥ ΕΡΜΑΙΟΥ, which I interpret as "(Coin) of the king, the preserver (Kadphizes) the kinsman of Hermæus." I have since found that the Mogul author Sanangsetzen declares, that the Tartar prince *Kanikia* bore the title of Prince of Mercy. It is probable therefore that *Kanishka's* title of *Korano* is derived from the Sanscrit *karuna*, mercy. This however still leaves unexplained the letters following *Koran* on the coins of Kadaphes and Kadphizes. On the former the title is XOPAN CV (and not XOPANOY as usually given). On the latter, it is KOPCO.

The happy conjecture made by Mr. James Prinsep in 1833, that the KANERKI of the coins was the great Buddhist Prince KANISHKA of Kashmir, has been amply confirmed by the Bauddha figures, emblems, and legends on the coins which I have just described. The Honorable

Mr. Turnour also identified them in 1836. In 1838, Professor Lassen did not object to the identification of the names of Kanerki and Kanishka; nor even to that of Oerki (or Huirki) and Hushka; but he added "besides the difficulties in chronology another reason from the coins themselves is opposed to our recognizing Hushka and Kanishka in Oerki and Kanerki. Both of them are described as Buddhists; upon the coins of the latter however a worship, entirely deviating from that of the Buddhists, is distinctly obvious."

The difficulties in chronology have, I think, been satisfactorily accommodated in my paper on the coinage of Kashmir already mentioned, in which I showed that the Tartar prince Kanishka, according to both Brahmanical and Buddhistical authorities, flourished at the beginning of the Christian era; agreeing with the age of the smaller Manikyala Tope opened by General Court. In that Tope there was found a long inscription of *Maharaja KANISHKA*, accompanied with four gold coins of *KANERKI*, and seven Roman silver coins ranging in date from B. C. 73 to 33. The copper coins belonged to Kanerki himself, and to his immediate predecessors Kadaphes of the Kuei-shang tribe, and Kadphises of the Hieu-mi tribe. The Tope must have been erected posterior to B. C. 33, and most probably after the death of Kanishka in about A. D. 25.

The other difficulty has been successfully removed by the discovery of the coins now published, which bear eminently characteristic Baudha figures, emblems, and inscriptions. On the golden bust coins we see the Prince himself represented with a halo round his head; with flames issuing from his shoulders, as sculptured on the figure of Buddha discovered by Dr. Gerard, (*J. A. S. Bengal*, vol. 3, pl. 26, fig. 1,) and with the prayer-cylinder (or *dharmma-chakra*) in his right hand; the identical instrument which is in the hand of every Lama of the present day.

The knowledge of this fact, of the identity of the religion of these two princes, we owe chiefly to the science of Numismatology; and the numismatist may proudly point to it as one of the many useful rays which the beacon of his favorite study has thrown over the treacherous quicksands of history. So true are the words of the poet,

The medal, faithful to its charge of fame,
Through climes and ages bears each Prince's name.

On Kunker formations, with Specimens. By Captain J. ABBOTT, B.A.

I have the pleasure to send you a few specimens of Kunker, collected by me in my late journey down the Ganges. I had purposed bringing away a small section of a Kunker formation, showing the substance in which it is imbedded and the strata immediately above and beneath ; but I was travelling in too great haste for this. The accompanying specimens, however, exhibit nearly every species of Kunker the matrix of one, and its calx after the extraction of the lime by fire.

I have been so separated from scientific literature for many years past, that I know not what may be the existing theories of the formation of this mineral ; and in offering the following am prepared to find myself forestalled if, indeed, the theory is well founded.

The word Kunker, in its general application, like our own term gravel, is applied by the natives to any small or rounded masses of stone, whatever their substance, but it includes especially every variety of the limestone under consideration. This is found in several forms in the wide plains of Upper and Central India. Not I think in Afghanistan nor Persia, nor any where beyond the influence of the periodical rains. It occurs only in mixed strata of sand and clay, which on analysis prove to be impregnated with lime, and its presence is generally denoted by the sterility of the soil above it.

Its position from the surface of the soil varies from ten to fifty feet or more. But although, through the erosion of the upper stratum (as for instance in the neighbourhood of large rivers) it may sometimes be found at the surface, it is never there formed or deposited originally.

Its forms are,—

1st. Small rounded drops, from the size of a pea to that of a bullet, in a matrix of clay and sand often of great depth, but seldom separated into distinct homogeneous strata.

2ndly. In distinct strata of larger masses, from the size of a small potato to that of a man's foot; with a matrix of clay, or of clay and sand mixed. In such cases the clay and sand strata are generally distinct.

3rdly. In what is improperly termed stratified Kunker, but which I take the liberty to name confluent Kunker, (almost all Kunker occurring in strata.) In this form it presents extensive fields, from one to five feet in thickness, generally very rugged and porous, but occasionally separable into compact masses of a hundred solid feet or more.

On considering the shapes of the granulated masses, they will be found to resemble the figures assumed by molten lead when plunged into water. The substance appears to be generally clay and carbonate of lime : the latter falling away freely under the action of the furnace, and leaving the clay in the form of a hardened mass more or less vitrified.

The formation of Kunker appears to me to be affected by the infiltration of rain water impregnated with lime through a bed of clay ; to be in fact Tufa deposited in clay, or a sponge of clay saturated with the carbonate of lime.

When the heavy rains of the monsoon fall upon a soil of alternate sand and clay strata impregnated with lime, the water easily soaks through the loose texture of the gneiss sand, taking up with it a certain proportion of the lime in its passage. But on meeting the closer substance of the clay stratum it there stagnates for a while, and each of these clay-strata becomes as it were the bottom of a subterranean lake, the absorption here being very gradual and difficult, and the water parting with its lime to the clay, ere it can be effected.

When the lime is contained by the soil in large quantity, and the clay stratum is dense or the duration of the deposit very long, confluent Kunker will be formed ; chiefly in the sandy stratum, but upon that of the clay : and should (if this surmise be just,) contain a larger proportion of sand than the granulated varieties.

When lime prevails in mixed soils of clay and sand, not distinctly stratified, the Kunker is found in very small grains dispersed confusedly through the mass. These seem to be formed by isolated drops of water impregnated with lime, which gradually filtering have deposited each a nucleus of lime, that yearly enlarges by fresh incrustations ; but very gradually, owing to there being no general arrest of the impregnated water. This minute Kunker forms the sand (so to speak,) of many of the streams of Central India.

Kunker yields almost the only lime used in Upper India by builders. The quality yielded by various strata is very various : often it is excellent, but never perhaps equal to that of the more solid limestones, or of the superficial Tufa deposited by streams.

It may appear improbable to some, that rain water should so readily absorb lime, or so easily part with it ; but it is perfectly consistent with observed phenomena. In Malwa where the substratum for 1500 feet is

trap, and no limestones are known, the springs are so impregnated with lime, taken up in their passage through the clay stratum, as to frost the glass of the windows splashed in moistening tatties. This frost work is as complete as that produced by fluoric acid. The smaller streams exhibit the same impregnation; and wherever they fall over a precipice, huge masses of Tufa are deposited by them on the yearly growth of lichens upon the brink.

I have seen many such masses of several hundred tons weight, and one of these, torn from the precipice apparently by its own gravity, was quarried for many years for the supply of the finer lime used at Mhow in Malwa, and is yet I believe unexhausted.

The obstructions of the human viscera so common in Malwa and Nimaur, I attribute to the action of the lime thus held in solution by the water. Tufa water is a well known poison in Italy. It saps the digestion, and causes gradual decay without any perceptible violence. The Italians observing this, fancy that it petrifies the vitals.

But one of the most remarkable examples of the action of water upon lime is observable in the mausoleum of Hoshungh Shah Ghorie, in Maandoo, Malwa. This building is faced within and without with a coarse granulated limestone from the Nerbudda, passing current in those parts for marble. From long neglect, Peepul and Dhamun trees have penetrated with their finer roots the substance of the dome, so that water filters through copiously during the monsoon, and, being preserved in small cavities, continues to drop down, long afterwards. This water in its passage through the mortar of the roof, takes up a certain quantity of lime, which it again deposits in the interior lining of the dome in long stalactitic pendants.

This fact was observed in the days of Ferishta the historian, for he says regarding it, (I quote from memory)—“ People who are rather devout than learned, think that the very marble weeps above the tomb of Hoshungh Shah. But we, who are above such puerilities, easily comprehend, how wind penetrating into the substance of the stone becomes there condensed into water.”

4, *Harrington Street*, 13th March, 1845.

J. ABBOTT.

NOTE.—The large masses are from confluent strata, below Allahabad. These strata from three to five feet thick are encrusted above with such large loose masses as these. One, however, is part of a *slab* of confluent Kunker, broken by me.—J. A.

*An account of the Early Abdalees. By Major R. LEECH, C.B., Late
Political Agent, Candahar.*

PREFACE.

In Nyamatulla's History of the Afghans, by Dorn, Aydal the son of Tareen, the son of Sharkhbun, the son of Sarbanni, the son of Pathan, is said to have had two brothers, Toor and Aspin; and three sons, Barik, Popal and Ali. Dorn in a note (38) on the authority of the Khulassat Ulansat, however, gives Abdal two sons, Firak* and Isa. Firak had three sons, Popal, Barek and Alekko;† and Isa had five sons, Alizye,‡ Turzye, (Noorzye of Elphinstone,) Ishakzye, Makoo and Khogani, which latter are called collectively Panjpai.§

Again Malcolm, in his History of Persia, on the authority of a native historian of no note, apparently a Barikzye writing for Persian readers, attributes the rise of Sado,|| the progenitor of the royal house of the Sadozyes, to the favor of a king of Persia, Shah Abbas the Great, (entitled by the Persians the Beatified¶) obtained on a visit to the Persian court to complain of the tyranny and extortions exercised and committed by a Persian Governor of Western Afghanistan. When about to return to his native land, the king conferred on him the title and privileges of a "Speen Jeerak" (white beard,) over the Afghans, including the power of life and death over them all, with the exception of the Barikzyes, and declared his person and the persons of his descendants sacred.**

It is even related by the Persians how Sado served for some time in the disguise of a groom in the royal stables; and having been promoted to the charge of one of the king's favorite horses, how he attracted the

* Known to the Afghans as Zeerak, as are the descendants of his three sons.

† His tomb is said to be at Neecharah in Beelochistan.

‡ Alizye is not the name of the son, which is Ali, but of his descendants; Zye being the Persian corruption of Zo'e, which in Pushtoo means a son.

§ Panjpai, though literally meaning five feet or five supports, is often applied to more than five subdivisions of a tribe.

|| Sado is still a common name among the Afghans.

¶ Jannat Makan.

** Which they continued to be until the murder of Shah Shuja-ul-Mulk at Cabool, in April 1842.

notice of Majesty by the striking effects of his assiduity in grooming.

Finally, in the History of India, Shah, an Abdalee Governor of Herat, is mentioned; and as these three items compose all the information which to my knowledge is possessed at the present day of the Early Abdalees, the following few pages have been compiled to supply much that is deficient, chiefly from a manuscript procured in Afghanistan, a second copy of which I never met with, and partly from accounts written at my request, and from enquiries made from time to time during a continued residence of five years in Afghanistan.

As the information now furnished was not possessed by the late Shah Shuja, I am in hopes it may not elsewhere be considered stale.

The following few prefatory "Remarks on the Origin of the Afghans," will not perhaps be thought misplaced, coming next and before treating of the Abdalees.

Much has been written on the descent of the Afghans. They believe themselves to be descended from king Saul. There are some circumstances against, and some in favour, of this belief.

Those against, are—

1st. They have among their predecessors no Jewish names except that of Kais, the Kish of Scripture (1 Samuel, chap. ix. verse 1,) who was according to some the first Afghan who believed in Mahommed, and in consequence received the title of Abdu Rasheed; the Jewish names now common among them being gleaned from the Kuran.

2nd. They have no vestige of the festival of Purim instituted by Esther, (chap. ix. verse 28.)

Those in favour, are—

1st. Contrary to the precepts of the Kuran, they do not permit a widow to marry any but the heirs of her husband, and the Jews did not allow a virgin to marry out of the tribe, (Numbers, chap. xxxvi. verse 8,) or a widow any but first her brother-in-law, (Deuteronomy, chap. xxv. verse 5). The heir however among the Afghans, in case of his not proposing for the widow, is not reduced to the alternative described in the 9th verse of the same chapter.

2nd. They do not allow daughters a portion of inheritance *with* the sons. Likewise did not the Jews at one time, if we judge by inference from Numbers, chap. xxvii. verse 8.

They have a custom alike repugnant to the Jewish as well as to the Mahommedan creed, common in Wales, where it is called "bundling." The Afghans call it "Namzad-bazee,"* or "betrothal game."

Khaja Nyamatulla, in his History of the Afghans, says that David swore to Saul, (1 Samuel, chap. xxiv. verses 21 and 22) that on Saul's death two of his wives were with child, one bare Berkia, and the other Irmia. The son of Irmia was Afkana, and the son of Berkia, Asif.

Sir W. Jones says, Saul had two sons, one called Berkia and the other Irmia, who served David faithfully, and were beloved by him. The son of Berkia was called Afghan, and the son of Irmia, Usbee.

Neither of these accounts agrees with the Scripture. The name of "Elkanah" is the only one occurring in the Books of Samuel, Kings, or Chronicles, in the least resembling Afghanah or Afkanah; and although it cannot by any Persian rule be corrupted from Elkanah, yet we find the name Hul, (Genesis, chap. x. verse 32,) corrupted into the Persian Hood.

Asaph (Asif,) the son of Berechiah (Berkia,) is mentioned; 1 Chronicles, chap. iv. verse 17; and Berechiah and Elkanah in the 23rd verse of the same chapter.

Berachah, Irmia (Jeremiah,) and Elkanah as connected with Saul, are mentioned, 1 Chronicles, chap. xii. verses 3, 4 and 8.

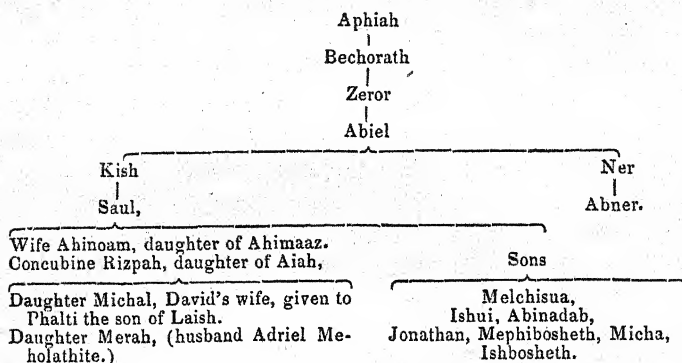
If we look upon Kais as a progenitor of the Afghans, and suppose that they increased in the same manner that the children of Israel did, (viz. at the rate of 2,100 for every year,) and also allow Kais to have lived in the time of Mahommed, then at the time that Elphinstone wrote, the Afghans should have amounted to 2,500,000. Elphinstone estimates them at 4,300,000. This would by the same calculation refer the progenitor of the Afghans back to about the time of Alexander.

If again Afghan, a grandson of Saul, was their progenitor in Elphinstone's time, by the same calculation they should have amounted to about 5,700,000, including the Afghans of Hindustan.

* This is allowed after the "Ijab kabool," formerly asking in marriage and accepting before witnesses, but before the *nika* or marriage ceremony, being the blessing of the Mulla. A settlement also being first fixed before the Mulla of the parish.

Sheer-bhá or "price of milk," is sometimes given to the mother of the daughter if a widow.

Among the descendants of Saul mentioned in the Scripture; as will be seen from the following, no name occurs approaching Elkanah or Afghanistan.



Elopement also takes place among the Afghans, and the clan in which the couple take refuge consider it a point of honor not to give them up to the tribe of the father. Arbitrators adjudge seven girls to be given in exchange, one actually mounted on horseback, and two others are valued at 100 Candahar rupees each; half is paid in ready money, and half in goods, a matchlock, a sword and a gonee or bag of grain, being each calculated at a Tuman of twenty rupees.

They (many tribes) divide their lands according to "Orbale" or fire-sides, and bachelors get nothing but their own zarkhureed or purchased lands. The tribe of Shimalzai Ghiljyes say, that their tribe was once so numerous, that by each man subscribing a bush of brushwood (used for fire-wood,) a couple was set up in the tribe. This subscription is called "Baspand."

On the 3rd November 1841, a widow, the daughter of Ashraf a Ba-eezye Hotak, complained to me as political agent at Kalat-i-Ghiljye, that her daughter had been engaged to one Ghafoor Bahlol-khel Julalgai Tokhee, a khoon-kash or bleeder by profession, for the last fourteen years; for the last eleven of which he had not been heard of, and was therefore to be considered dead. She therefore wanted his heir (a brother) to dissolve the contract, take her himself off her hands to what was now become her tribe, or support her while for a further period she waited for her intended.

Tareen, the son of Sharkhboon (alias Sharafudeen,) the son of Surbannee, the son of Kais (Kish Abdu Rasheed, and Pathan) is said to have had three sons; one, whose complexion was dark, he called Tor (black,) another, whose complexion was fair, he named 'Speen (white,) and the third, he called Abdal.

Abdal, pronounced Oudle by the Toran Ghiljyes, is the title of a grade of Fakeers, vide Hasan Abdal, whose shrine is in Putwar (the country between the Indus and Jhelum) in the Panjab. The other degrees being Ghous, Kutb, and Majzoob, or Kalandar.

Tor had four sons, Malmooinee, Gundaree, Sekee and Baboo, and some say also a daughter, Kakee.

Malmooinee had two sons, Haroon and Aleec.

'Speen, the son of Tareen, had four sons, Dur, (Duver, Dabar) Suleman-lagh, Tam and Opchee, (Adhami).

Tor and 'Speen were of one mother, and Abdal of a separate one.

When Tareen was well advanced in years, Tor and 'Speen had grown up, but Abdal was still a boy. One of Tareen's wives one day observed to him, that he had got old, and it was better that during his lifetime he should nominate as his successor in the chiefship his most promising son, and himself seek retirement, and pass his time in the service of God.

Of this, Tareen approved. Tor and 'Speen each hoped the lot would fall on him, and their mother's wishes were for Tor, her first-born. 'Speen was annoyed at this prospect, expressed his annoyance, and advanced his own claims. The mother of Abdal with great humility and modesty brought forward her son's claims, which were, that notwithstanding his youth he possessed more noble qualities than either of his brothers. Tor and 'Speen were both annoyed at this, and said, "Our young brother is no more fit to rule than our old father." One day a holy Sayad who had given up the world arrived, and Tareen referred the choice to him, saying himself that he had a foreboding that Abdal would be chosen. The Sayad after being some time absorbed in thought raised his head, and after regarding all three, said—"The third is the appointed chief; and although Tor will do everything to oppose him, he shall not succeed; 'Speen is no way entitled to the chiefship." (That is, neither by primogeniture or promising talents.)

The Sayad then told Tareen to confer the Dastar (turban) on his youngest son, and the chiefship would remain for generations in his

house. He also told Tor and 'Speen, that it would be for their good to obey Abdal.

Tor made many protests and objections; 'Speen silently took his leave. Tareen then placed the dastar on Abdal, and called for a blessing on him. He at last grew up, and disclosed all the qualities his mother and the Sayad had seen in promise. Tor and 'Speen were always called Tareens, and their descendants are now found in the district of Pishing, in the province of Candahar. Abdal lived 105 years, and his descendants were called after him "Abdalees" and not Tareens. He had two sons, Razad and Suleman. The Maghzan-ul-Afghanee says, one son called Jeer, others say Eesa.

When Abdal was advanced in years he sent for his son Razad, and appointed him his successor after giving him the following parting advice: "Do not forget your God, and conduct your public and private life accordingly. Treat with respect the tribe of Sarbannees, Sayads and learned and devout men; support and provide for your relations, and treat your subjects with kindness." That is to say, have a fair speech and a fat sheep for them, the grand secret of Afghan popularity.

Razad had three sons, Eesa, Alee and Ado. The first named was the youngest, and the two elder lived the life of Dervishes. Razad before his death appointed Eesa his successor, and his choice was confirmed by all the Sarbannees. Razad lived to the age of 120 years, having seen his descendants to the third generation.

Eesa had three sons, Meerak, Suleman alias Zeerak, (from his being forward of his age), and Noor. Eesa on his death approaching, collected, according to the custom of that time, the whole of his tribe and descendants, and appointed Zeerak, although his second son, his successor. Every one at once agreed but Meerak; who at last also did, after his father assured him that his choice was guided in a dream from heaven. Eesa lived 140 years. Zeerak had four sons, Barak, Alaho, Mase and Popal.

When Zeerak reached the age of 120, he called his descendants and tribe together, and requested their opinion regarding who ought to be his successor. They all pointed to Barak, and his father accordingly confirmed him, and he carried on the chiefship fifteen years during his father's life.

It was the custom of the tribe to change their encampment at different seasons, and every one was obliged to take his own baggage and

property to the new ground. It so occurred that in one of these emigrations, Zeerak who from old age had become quite decrepit, was left behind.*

The four brothers, according to custom, returned to the old encampment to see that nothing was forgotten. News was brought that Zeerak had been left behind, being unable to move. Barak first arrived where his father was lying. Turning his horse's head towards him without dismounting, he abused him, saying, "Are you not dead yet, that I may be no longer troubled with you?"

Alako then saw him, and said, "Oh son of Adam, would that you were dead, and ceased to trouble us!" And then passed on, as had Barak. Mase next came, and, seeing his father, dismounted, and ordered one of his people to mount him on a horse and conduct him to the new encampment. Zeerak pleaded that he was unable to sit on a horse. Mase in a passion gave the old man a kick, saying to his attendant, "Let the old brute lie there to be devoured by wild beasts and birds."

At last came Popal, who immediately dismounted, and, taking Zeerak's head on his lap, brushed the dirt off his venerable face, and shed tears, and said, "Would to God that I had never been born, that I should live to see you, my father, in this plight." He then lifted up his father with great care, and, carrying him on his back, ordered his people to convey the baggage on ahead, and he would follow with his sacred burden slowly after. On arriving at the new encampment, he ordered suitable food to be drest for his father. When the old man had eaten and was refreshed, he expressed a wish to utter some prayers, to which he begged attention should be paid.

First he said to Barak: "Your fields† will be many, but may you find no favour with God."‡

Regarding Alako he said: "May you never be free from cares and troubles."

To Mase he said: "May one of your houses fall as the other rises."

To Popal he said: "Be your descendants always chiefs and never servants, and may your foot never be out of the stirrup of wealth."

* I witnessed something similar myself in the Ghiljye country in General Nott's advance on Ghuznee and Cabool. In a village that had been hurriedly deserted we found nothing but a cripple.

† "Bar," breadth (of domain.)

‡ "Barkat," luck, good fortune.

He then said, "I have already given, with the advice of the tribe, the chiefship to Barak, and it is no longer in my power, but theirs. But," (turning his eyes and stretching out his hands to heaven,) "may the descendants of Popal be always 'Raíses,' and may the descendants of his brothers serve him." He then told Popal to be of good cheer, that the time was near at hand when he should become chief, and that the Sayad who had interceded in the dispute of Tor and 'Speen had appeared to him in a dream, and assured him Popal would be chief. After blessing him, he lived five years.

Six months did not elapse after the tribe had heard this blessing before they left Barak, and gathered round Popal who became chief, and Zeerak saw with his own eyes his prayers answered. Zeerak lived 89 years.

Popal became chief at 25 years of age. He was a very just and popular chief. In his time the descendants of Tareen mustered 30,000. In a revolution among the tribe of Kakers, the chief sought refuge with Popal, who with a force espoused his cause, reinstated his guest, and took hostages from the Kakers. From which time the Kakers never opposed the Popalzyes. He also took hostages from the Baloches and the Hazarahs. He ruled 65 years, and had three sons, Habeeb, Aiyoob and Bago. When his end was approaching, he assembled his tribe and appointed Habeeb, his eldest son, his successor, who lived 52 years. During Aiyoob's lifetime he and his sons lived with Habeeb. On his death, which took place before the other two, Bazo disputed with Habeeb for his having all the descendants of Aiyoob. The tribe interfered, and gave half to each.

Habeeb had four sons, Ismail, Hasan, Bame and Aboosaieed. The two former were much older than the two latter.

The daughter of Bazo was engaged to Bame. On Habeeb feeling his end approaching, he collected his tribe, and told them to nominate his successor. Ismail and Hasan, both canvassed the tribe for votes, and therefore both soon quarrelled. Bazo proposed Ismail, as being the eldest. Hasan would not hear of it. Bazo then proposed Bame, and proposed that he himself should act as regent during his minority. Habeeb agreed to this; Ismail and Aboosaieed would not agree, and separated themselves from the tribe.

Bame was accordingly appointed chief at the age of 15. After which Habeeb lived two years.

Bame lived to the age of 72; and had three sons, Nasrat, Basahma and Kane.

On Bame becoming aged, he neglected to nominate his successor as was the custom; the tribe therefore assembled, and demanded the reason. In reply he said, "I really do not see among my sons one worthy; but if I confess this to the Tor and 'Speen Tareens, they will not allow the chiefship to remain in the house of Abdal. Indeed I have heard from the Tareens that they had no hope in my sons. I will therefore not appoint a successor. I have also dreamt, that none of my sons will be chiefs, but that a grandson, a son of Kane, will be. If on my death any one of my sons be found with anything, he will get the chiefship without any nomination of mine. According to the dream, so it occurred; the sons of Bame did not agree among themselves, and there were separate small chiefs called "Katkhudas,"* except in cases of blood or large general tribe feuds, when they referred to Kane. He lived to the age of 80; and had three sons, Bahlol, Zeenak and Bano. The tribe was for some time much distracted in factions and petty feuds. At last the chief men assembled, and decided, as there was no getting on without a "Rais" or "Sardar," they would appoint Bahlol. During the chiefship of Bahlol, Kane lived 12 years.

Bahlol lived 105 years; and had two sons, Maroof and Alee-khan; (the first time the title of *khan* occurs). Bahlol appointed Maroof at the age of 30 years, his successor. Maroof was very severe in his rule, and had the curses of his tribe: on which account he did not reign more than ten years, and then died of a severe complaint. His heirs in a short time ran through with all the property he left.

Two months after his death, one of his wives bare a son, by name Umar. His father and mother used to visit the Isakzye and Aleazye shrines for fortune for their son; Umar had no property. When Umar was about 14 years of age, the Abdalees of the hills made many seizures of lands, and many disputes and feuds arose in the tribe in consequence. The chiefs at last agreed to appoint Umar, who had now grown up, to divide the lands, and apportion them fairly, and to be their representative in all their communications with the Beglar-begee of

* In the time of the Duranee kings when the Khans received their pay from the treasury, they deducted from every horseman (Sahir) $\frac{1}{4}$ rupee on account of the Katkhuda, who was an officer appointed to every 100 men to collect them when called for the service of the State.

Candahar. (This implies a Persian rule in that province). When Umar was one year old, Ako Alezye, a noted person for sanctity in those times, with his son Khalo then 100 years old, and his grandson Mando, then 85 years old, came to the house of Umar's mother; who killed a goat and its kid, which was all she had for them. They in return prayed for her, and told her she would soon gain her heart's desire. Ako told her that he had seen two dreams regarding the child Umar; one was, that he had seen a lion enter the house of Umar, which meant that he would have a son, whose name should be called Asadullah, "Lion of God:" the second dream was, that he saw the house of Asadullah, who should also be called Sado, covered with a hog's skin. The mother of Umar entertained great apprehensions regarding the mention of the unclean beast; but Ako comforted her, by assuring her that the hog's skin meant wealth.

The Afghans (some) pretend to believe that Ako's dream of the hog's skin referred to the alliance formed by a descendant of Soda, (Shah Shuja-ul-Mulk) with the pork-eating English!! who entered Afghanistan with him in the Turkish year of the hog!!! (1839.)

The chiefs in pursuance of their determination waited on Umar, taking with them food for their own consumption as they knew the poverty of Umar, and appointed him their chief. His first care was, to settle the land disputes on a basis which ever after remained unshaken.

As chief, he held communication on the part of the tribe with the Beglar-begee of Candahar.

During his time the Barakzyes of the hills rebelled, and maltreated his emissaries sent to make the usual collections, saying, "The chiefship was given to us by our forefather, and Popal took it by force."

Umar immediately collected his force for the reduction of the Barakzyes, in which he succeeded taking hostages from them, as well as from some Noorzyes who bordered on the Barakzyes, and joined in the rebellion. He lived 98 years; and had two sons, Asadullah (Sado) and Saleh.

Another informant, an Alezye chief says, Sado after being blessed by Ako, who was a disciple of Sakhee Sarwar's, found a treasure, and by means of it gained influence in the tribe. If this story be a fabrication, it at least betrays a knowledge of the Afghan character.

In 1841, there was in Cabool a Salehzye, named Hajee-khan, who said he was the last of his tribe. He and Taizulla-khan of Candahar, now

dead, a brother of my Aleezye informant, were reckoned almost the only men in Afghanistan who possessed a knowledge of Afghan history.

Some say, that Umar was told in a dream by a vision of his forefather Eesa, to name his sons Saleh and Soda. Saleh became the disciple of a saint, gave up the world, and passed his time in austere devotions.

When Umar reached the age of 89, Sado being 25 years old, and Saleh 60, he collected his tribe and informed them that as his end was approaching, he must name a successor. That as for Saleh, he had given up the world, and was in no way adapted for the chiefship. That Sado had been nominated by the Aleezye Fakeers, Ako, Khalo and Mando, and was moreover thought by him the most fit. The tribe immediately confirmed, as did Saleh who, when doing so, spoke these words: "I have five sons; Durkhan, Ibrahim-khan, Bazeed-khan, Maya and Alo, who again have children. Let Sado exempt the whole of my descendants from taxation of every kind as long as the chiefship remains in the house of Sado." This was agreed to by Sado before his father and the tribe.

Umar and Saleh then girt Sado's loins. This is still a custom in Afghanistan. On a king ascending the throne, some saintly character of great fame is sent for, who undoes his own "langootee," and puts it round the waist of the king, who in return invests the saint with a splendid dress of honor. Sado's turban was then put on by Alee, the son of Mando Aleezye, and all the people prayed for his long life and prosperity.

Some time after the accession of Sado, Khaja Khidr and Ismail, grandsons of Neknam, a Barikzye Malik, rebelled against his authority, and refused to admit his "Mahsals," revenue collectors and bailiffs, into their districts; on the plea that their progenitor Barak ruled for fifteen years, and that Popal got the chiefship unjustly, and by boyish blandishments. They agreed to give a sheep or two now and then, according to their ability, but would not agree to the daily demands and constant sending of Mahsals, some of whom they forcibly ejected from their districts. On hearing this, Sado became furious, and collected his force. Other Barikzyes came and begged forgiveness, entreating Sado not to attend to what a few fools or madmen said; and promised themselves to punish their rebellious fellow tribesmen. By this Sado was pacified, and appointing other chiefs, and giving them his countenance, deputed them to punish

the rebels, which they faithfully did. Khaja Khidr being slain, some Kutezyes also evinced a rebellious spirit ; and were chastised, and security for their future good behaviour was taken. The other tribes profited by the example. Sado behaved liberally to all who acknowledged his authority, and punished all severely who disobeyed him. He listened to the petitions of the poor, dispensed justice strictly according to the Shara, was pacific in his policy, and protected his subjects. His government was established over the Abdalees on a basis that had never been in a like manner secured by his forefathers.

When at leisure from the Abdalees, he subjugated, partly by conciliation and partly by force, the tribes of Ghiljyes and Hazarahs, in whose disputes he was sole arbitrator. He built several mosques and schools, as well as many works of utility, such as bridges, wells, and roads.

He lived in all 75 years ; and had five sons, Khaja Khidr-khan, Moudood-khan, Zafran-khan, Kamran-khan, and Bahadur-khan.

Khaja Khidr-khan and Kamran-khan are said to have been of one mother, and Zafran-khan of a slave girl.

The Bahadur-khels settled in Multan, where and at Dera Ismail-khan and Tak-i-Sarwar-khan, there are some remains.

Muzaffar-khan, governor of Multan, was a Bahadur-khel.

The Kamran-khels were divided into Eesa-khels and Moosa-khels.

Usman-khan, who was Shah Shuja's vizier in 1841, traced his descent as follows, from Kamran, viz. : Usman, the son of Ramatullah, Shah Zeman's vizier, the son of Fatullah, the son of Haroon, the son of Yoosaf, the son of Yakoob, the son of Moosa, the son of Kamran.

Walee Mahammad-khan, another Sadozye of rank at Candahar, who also gave me some information, traced his descent from Kamran, as follows : Walee Mahammad, the son of Abdu Salam-khan, who was a brother of Abdul-khalik-khan, (who rebelled against Shah Zeman), the son of Rahman-khan, the son of Abdullah-khan, (who, according to some, gave his daughter in marriage to Meer Wais Ghiljye, who had two sons by her, Shah Mahmood and Shah Husen, receiving in marriage in return Meer Wais's daughter), the son of Jafar Sultan, (whose residence and control was at Potye-i-Sadozye and Shahr-i-Safa by one account, whose wife named Durkhee gave her daughter Khanzad to Meer Wais's mother for her son), son of Eesa, son of Kamran.

The two first of Sado's sons were the most forward and talented, and the other three were not much noticed either by their father or the tribe, some of whom inclined to Khaja Khidr-khan, and some to Moudood-khan. When Sado grew enfeebled through age, he collected his tribe, and told them to choose among the two. Moudood-khan being the eldest, was elected chief; but Sado remonstrated, saying, "Although Khaja Khidr-khan is the youngest, yet he has more noble qualities than his four brothers. I also saw a dream regarding him, as follows:

"After midnight, an old white-bearded man with a green stick, and a green wrapper round him, made his appearance. The effulgence of his countenance was such, that I fancied a light had been brought into the room. Steadfastly regarding him, I hardly knew whether I was awake or was seeing a dream.

"I started—awoke, and arose, as did my wife; I then enquired from the vision, 'why he had honored my humble house by entering it?' He replied, 'Be joyful, for God will give you a son, whom you must call Khaja Khidr; who shall so excel in every good quality, that men shall be unable fully to sing his deserts.' On asking the vision his name, he evaded the question; I prest him, he at last replied, 'The child is to be called after me.' He then took his departure, and I followed him some paces, when dismissing me he shortly vanished from my sight. On my son's birth, I called him Khaja Khidr. Now although I love all my sons equally, yet, on account of my dream, I incline to think him fittest to be chief."

The Sarbannees however still persisted in their choice of Moudood Khan.

Khaja Khidr-khan then proposed, that the tribe should range themselves on his or his brother's side as they chose. The Sarbannees would not agree to this, saying with great truth, that a division would be prejudicial to the general interests of the tribe. It was finally settled, that Moudood-khan should be chief, and Khaja Khidr-khan his deputy.

During the lifetime of Sado their father, the former delegated all his powers to the latter, and merely retained the name of chief; but on the death of Sado the tribe with one consent transferred the chiefship to Khaja Khidr-khan, who became very popular, being approved of by the saints, and being talented, conciliatory, and liberal.

Khaja Khidr-khan became chief at thirty-five years of age, and ruled forty-seven years. He had two sons, Khudadad Sultan and Sher-khan. This is the first time the title of Sultan occurs. He is known among the Afghans as Sultan Khudakye, who divided the lands of the Abdalees and Ghiljyes at Pul-i-Sangee with Sultan Malakhe Ghiljye.* This title of Sultan, I have reason to suppose, was conferred by Aurangzeb.† Khudadad Sultan, on the death of his father Khaja Khidr-khan, became chief without any opposition from his brother.

He soon afterwards invaded the territory of Jyob, and laid it waste while the inhabitants fled to the hills. On his return, a man of the country and his three children were intercepted in a ravine, unable to flee; when brought before him he immediately ordered them to be killed, although they appeared innocent and godly people.

Pitching his camp near the spot, at night he saw a vision. The four murdered persons appeared, and threatened him with the death he had so unjustly inflicted on them. Terror had taken possession of his soul, when the same vision with the green stick and green garment that had appeared to Sado made his appearance, and, after reproaching him with his tyrannical act, promised to save him, provided he would immediately abdicate in favor of his brother Sher-khan, and act as his deputy. Khudadad Sultan awoke in great dread, and assembling his attendants and followers, renounced the chiefship in favor of Sher-khan, and informed him he had done so by an express courier or "Chapar."

During the chiefship of Khudadad Sultan a friendly communication was sustained with the Beglar-begee of Candahar, but soon after Sher Khan's accession it received a sudden check in the following manner.—The Beglar-begee of Candahar had sent a force towards Foshanj (Pishing) to collect the taxes on land and sheep, called Maldaghees and Sargalye. Having finished their collections, they were returning to Candahar. On arriving at the Kojak Pass they were attacked, defeated, and nearly all slain by the Abdalees: some fled, but were pursued, and, being overtaken, lost their horses and clothes.

* The dispute was regarding the two districts of Omakye and Gwaharye, and is said to have been settled by a shepherd, appealed to by both parties, on the simple principle that Khudakye and Gwaharye sounded well together as did Malakhe and Omakye.

† I have seen the original Rukum of Aurangzeb to Sultan Malakhe, giving him charge of the King's road from Kalat to Karatoo, to keep it clear of the Hazarah robbers.

On the Beglar-begee hearing of this, he wrote to Sher-khan, requesting him to send the culprits to Candahar. Sher-khan made excuses, saying, that Beeloches, Kakers, and other migratory tribes inhabited the neighbourhood of the Kojak, and the real depredators were therefore difficult to discover. The Beglar-begee enraged at this, by way of reprisal, attacked and plundered the Abdalees who inhabited the neighbourhood of Candahar. Sher-khan on hearing this collected his tribe, and both parties arranged themselves for hostilities.

At this time Pishing, Sharabak, Shawl, Harnye, and Mastung were all dependencies of Candahar. On this difference arising, all communication between Candahar and these places was stopt; and on Sher-khan succeeding, which he did, in gaining possession of Shah Safa, a post only nine farsakhs from Candahar, the communication with Kalat-i-Ghiljye, the Ghiljyes, and Hazarahs, was also cut off.

In this dilemma the Beglar-begee wrote for instructions from his master, the king of Persia, who in reply ordered him to look out for some rival chief in the same tribe and patronize him.

The Beglar-begee sought out and found Shah Husen-khan, a cousin of Sher-khan, on whom the king of Persia conferred the title of a Prince-royal, viz. *Meerza*.

Meerza Shah Husen took up his residence at Deh-i-Shekh, and Sher-khan at Shahr-i-Safa, and thus the first division among the Abdalees took place. The tribe often remonstrated with Shah Husen Meerza, and protested against Mogul interference. As he stoutly denied being under Persian influence, he had adherents in the tribe as well as Sher-khan; indeed the Abdalees constantly said they did not care which brother they obeyed so long as the Moguls (Persians) did not interfere.

Jaleel Aleezye was Shah Husen Meerza's right-hand man, and was always deputed by him to Candahar to negotiate with the Beglar-begee. Some years past in this manner. On Jaleel taking his leave after one of his visits to Candahar, the Beglar-begee entrusted him with the following message for his master Shah Husen Meerza: "The king of Persia, my master, has honored you by adopting you as his son, and has conferred on you the princely title of Meerza; you have 30 or 40,000 men. I also have a force, and every day fresh orders come from my master for the destruction of Sher-khan's power; believe me, our delaying any longer can only do us harm at court."

The Ameens of the Chaghatye monarch in Eastern Afghanistan heard of this and reported it to their master, the king of Dehli, and pointed out that Sher-khan was a man of great influence in his tribe who had excited the wrath of the king of Persia by opposing his cousin Shah Husen Meerza, who was supported by that monarch, and was on that account disposed to receive the protection of the king of India, which they strongly recommended should be extended to him.

This recommendation brought letters of encouragement, and the title of *Shahzadah* for Sher-khan from the Emperor of Delhi, who enjoined the Soobhadar of Cabool and Hakim of Ghuznee to afford Sher-khan assistance whenever he required it.

On receiving these honors the power of Sher-khan increased, and Meerza Shah Husen's declined in proportion. This was to be expected, for the Afghans would naturally prefer the Sunnee king of Delhi to the Sheeah king of Persia: and doubtlessly Sher-khan immediately indented on the Governors of Cabool and Ghuznee for dresses of honor for his adherents, and created a rival of popularity by this means also in the tribe.

Jaleel Aleezye was immediately despatched with this intelligence to the Beglar-begee of Candahar, who reported it to his master the king of Persia. In reply, a horse and a dress of honor were sent for Shah Husen Meerza, and dresses of honor and letters of encouragement for his adherents were despatched by the hands of Jaleel Aleezye, who was also bearer of a message to Shah Husen Meerza from the Beglar-begee, which was, that the Beglar-begee had much wished to come himself to visit the Abdalee chief, but was prevented by the unquiet state of some of his districts, and hoped that he would be able to come to Candahar. An interview had often before been talked of, but Shah Husen Meerza always, when invited to Candahar, excused himself, pointing out the advantages his rival, Sher-khan, would gain in his absence from the tribe. This time, however, flattered by the receipt of the king of Persia's presents, and burning with jealousy at the increasing power of his rival, he consented. The tribe, hearing of his intention, assembled, and said, "You may go to Candahar of course, if you like; but we warn you that something may take place to our detriment, such as a dispute or a quarrel with the Moguls." Shah Husen Meerza, notwithstanding the warning, set out for Candahar; and appeared at the Beglar-begee's durbar.

Jaleel Aleeye always stood with his hands joined in the presence of Shah Husen Meerza, his master; but as he was Wakeel at Candahar, the Beglar-begee allowed him always to sit, as he did on the present occasion.

Jaleel was a handsome and clever-spoken man; Shah Husen Meerza was slow-speaking, black, and short.

Jaleel constantly introduced his own opinions in the conversation, and was told by signs to be quiet. These had no effect, and he more than once interrupted what his master was saying; took the words out of his mouth, and finished his sentence for him. Shah Husen Meerza, unable to contain himself, at last said, "Slave of low origin, what does this disrespectful behaviour, and these interruptions mean?"

Jaleel foolishly allowed himself to reply, "A slave is always known by his color."

Quick as thought Shah Husen drew his dagger, and sheathed it in the body of Jaleel, who expired immediately, his entrails protruding on the carpet. On witnessing this tragedy, the Beglar-begee and whole court rose hastily, partly in alarm and partly in rage. Shah Husen Meerza no sooner observed this than throwing away his dagger, he said, "Be not concerned; that slave has only paid the forfeit of his impertinence."

As he was the adopted son of the king of Persia, they contented themselves with putting him in restraint; while they reported the tragedy, and waited for instructions.

A decision arrived from the king of Persia to the effect, that Shah Husen Meerza was quite right in killing his slave, if he offended. Fresh dresses of honor were despatched with a letter of encouragement to the prisoner, who was ordered to be released immediately, and sent to his government. This favor, however, came too late; the mischief had been done already, for during Shah Husen's confinement the whole tribe of Abdalees had gone over to Sher-khan, and acknowledged his authority.

Meerza Shah Husen therefore, on obtaining his release, went direct to Sher-khan, and, acknowledging his authority, expressed his determination of proceeding to Hindustan; which he soon after carried into effect, leaving Sher-khan in absolute undisputed possession of the chiefship.

When the Beglar-begee heard of this he wrote to the king of Persia, who sent a letter to Sher-khan, couched in these words: "There is bro-

therhood between my house and that of the Koraganees; if you have been made a Shahzadah by the king of Delhi, I also adopt you as my son, and allow you full authority over your own tribe independent of the Beglar-begee; but if he is attacked, or otherwise requires your assistance, give it him."

Sher-khan accepted these honors, and appointed as naiks or deputies, Badal Banezye, and Meer, son of Mubarak, son of Jalaludeen Alakozye.

The Beglar-begee at intervals sent people to make complimentary enquiries after Sher-khan's health, and requested that the deputies Badal and Meer should attend on him at Candahar.

Meer Alakozye was alone sent, and directed, if enquiries were made for Badal, to make an excuse that he was ill, and to say that he would make his appearance on his recovery; or if that should be retarded, some one should be sent in his stead. Meer arrived, and had an interview with the Beglar-begee, whom he found preparing a force to collect the revenue of the districts of Shorabak, Fishing, and Huruge, via the Kojak Pass.

Meer, being presented with a dress of honor and a horse, sent a small detachment of his own men in company with the Moghul troops, who saw them safe across the Pass, and overawed the above districts into payment of revenue, for which assistance he received further khiluts and his leave.

A difficulty however arose, which was, to get the Persian detachment with their collections across the Pass on their return to Candahar.

Sher-khan was therefore again written to, who this time despatched Badal Banezye with an introduction, which, after the detachment had been by him seen safe across the Kojak, procured for him a dress of honor and two horses.

He received his leave and charge of seven horses with golden trappings, and various pieces of rich Persian stuffs for his master Sher-khan, which had been sent by the king of Persia with an encouraging letter.

Sher-khan became chief at thirty-two years of age, and lived in all sixty-five years; and had one son, named Sarmast-khan.

When he was twenty years of age, his father Sher-khan being much addicted to the chase, went one Friday out hunting, and had a fall from his horse; his attendants taking him home senseless. On opening his eyes, and seeing Sarmast-khan, he desired Bakhtyar-khan,

grandson of Saleh, might be sent for. On his arrival, he thus made known his wishes to the couple : " My recovery is out of the question : therefore, as Sarmast-khan is but a boy, I appoint you, Bakhtyar-khan, his guardian ; let him follow my example. And do you, Sarmast, attend to the advice of Bakhtyar-khan, and appoint him your deputy should you ever be absent from your tribe ; and, remember, be liberal. I have spent my life as heart could desire ; I have nothing to regret not having done. I have so behaved to the tribe, foes, and friends, that they will never forget me. If a friend and a foe quarrelled in my presence, I never decided so, that favor if existing should appear ; and at other proper times, I have so treated my friend, that the people flocked to him ; so that whenever a foe appeared, so many friends arose for me, that he became powerless. If any one in the tribe belied another, or aspersed his character, I never publicly exposed either, or lowered a friend in the eyes of the people."

Sher-khan died three days after this. Sarmast-khan faithfully followed the precepts his father had taught him. He lived in all 50 years. He had three sons, Doulat-khan, and two others whose names are not known, as they died without issue.

On the death of Sarmast-khan, as Doulat-khan was quite a boy, Haiyat Sultan succeeded to the chiefship of the tribe. He was a cousin of Sarmast-khan's. He also conducted all communications with the Beglar-begee of Candahar.

This latter once made a feast, and invited to it all the Afghan chiefs, Kat-khudahs and Sar-khels, to meet his own Moghul Sardars. Wine was introduced, and ceremony thrown aside. Haiyat Sultan and the other Afghans were induced to join in the revelry, and, as they were not so accustomed to the juice of the grape as their entertainers, soon got intoxicated. From the praises of wine it was not long before the company entered upon the praises of woman ; each party, of course, becoming the champions of its own countrywomen. At last proposals for inter-marriages were made, and agreed to by both parties. Seven Afghan daughters were betrothed by name to as many of the Persian officers, and vice versâ, and dresses of honor were given to their Afghan fathers-in-law that were to be. Next morning Haiyat Sultan on getting sober, became painfully aware how he and his companions had committed themselves, and was at a loss how to leave Candahar. In this dilemma

Mubarik, one of the Afghan Kat-khudahs, a man of experience and expedients, suggested that the Persians should be told that it was their custom that the bridegrooms should visit the houses of the brides,* the consent of whose relations would also be first required.

The Afghan chiefs thus got their leave, and they returned to their tribe, accompanied by some of their would-be sons-in-law, and several matrons to attend the brides, and bring them to Candahar.

On the news of these mutual engagements spreading, the whole of the Sarbannes and Abdalees besieged Haiyat Sultan on his return, and a council was held.

Doulat-khan had by this time grown up, and had his seat in all the councils (*pūjahs*.) On the present occasion, after paying all due deference to his uncle, he proposed to try the Moghuls to suggest they should first give their daughters to the Afghans. This was proposed accordingly. The Moghuls however replied, that their daughters were far off at Ispahan, while those of the Afghans were close at hand, and could be according to agreement married, while theirs were being sent for. The rude Afghan chiefs were led by this to believe, that the intentions of the Moghuls were not honorable; and they called on Haiyat Sultan, who had brought them into this scrape, to get them out of it.

Haiyat Sultan saying, as he had been for a long time friends with the Beglar-begee he could not give an unbiased opinion, rose from the council and sought his private apartment, deputing Doulat-khan to act in his stead.

Doulat-khan's speech was a true Afghan one. "If," said he, "you take my advice, you will sacrifice four of these Sheeah Moghuls to our four Sunnee Yars, (four first caliphs, excluding Alee the fifth, the favorite of the Sheeahs,) as a punishment for their presumption; and hand the matrons over to Masoor Baneezye, who will provide for them." This method of cutting the gordian knot of their difficulties being highly approved of by the assembled simple, hospitable, and brave chiefs, the throats of four of their principal guests were cut.

On this treachery reaching the Beglar-begee, he wrote reproaching Haiyat Sultan, who excused himself, and laid the blame on Doulat-khan. The Persian governor then challenged Haiyat Sultan to prove his non-

*When they are very high in rank, they send their swords instead, to represent their persons.

participation in this foul massacre by coming to make friends with him again at Candahar. This he excused himself from doing, saying he would not be permitted to do so by the tribe.

All retribution or apology thus being withheld, the Beglar-begee collected a force under one of his chiefs, named Farrukh, and despatched it against the Afghans, and a great battle was fought at Yaggak, in which the Persians were defeated, and their commander killed. The Beglar-begee believing the old saying, that "the painter's second drawing is the best," sent another force, before the Afghans thought he would have heart or power to collect it, and fully retrieved the former defeat, and effectually punished the Afghans' perfidy. Haiyat Sultan retired to Hindustan. He had two sons, Abdulla-khan and Khan Mahammad-khan. Abdulla-khan had four sons, Allaiyar, Sadullah, Khan Mahammad, and Alea.

Khan Mahammad-khan had two sons; Raheem-khan, who fled to the Deccan from Ahmad Shah, and was not after heard of, and Akbar Shah, blinded by Ahmad Shah, whose son was Khan-i-khanan. During Doulat-khan's time the Beglar-begee was recalled by the court of Persia, and another governor sent in his stead, with whom Attal and Iz-zat Sadozyes and Meer Wais-khan Ghilgye intrigued against Doulat-khan, while they pretended to be his friends. Their object was to set aside Doulat-khan. The two Sadozyes becoming chiefs of the Abdalees and Meer Wais-khan of the Ghiljyes; having at last succeeded in imbuing the mind of Doulat-khan with suspicion of the Beglar-begee, and in incensing the latter against him.

Doulat-khan was suddenly besieged in a small fort on the outskirts of his tribe, taken prisoner, and with his son Nazar-khan, and favourite and confidential slave, Fakeer, put to death. His tomb is in the Razabagh at Kohak near Candahar. He left two sons, Rustam-khan and Mahammad Zuman-khan. Nazar-khan is said to have been Doulat's brother by some.

On this occurrence Rustam-khan sought the tribe, and gained such influence there as to make the Beglar-begee anxious to secure his friendship. He therefore wrote, proposing that the past should be buried in oblivion, and that his two principal advisers, Sarwar-khan Baneezye, the son of Bukhtyar-khan, and Katak Kootezye Alakozye, should be despatched to Candahar to arrange the terms of friendship and alliance. They were despatched, and, on their return with dresses of honor, gave

such a favourable account of their reception as to induce their master to accept the invitation of the Beglar-begee, of which they were the bearers.

Rustam-khan was confirmed in the chiefship by the king of Persia; he kept on such good terms with the governor, and was held in such high estimation by the whole Moghul force, that many swore by his head.

A rebellion broke out among the Beeloches, and, as was usual, Rustam-khan was called on to despatch a small Afghan detachment with the Moghul troops, which latter were defeated. This was taken advantage of by Hajee Meer Wais-khan Ghiljaee, and by Attal-khan and Izzat-khan Sadozyes, who were Rustam's rivals at court; and the Beglar-begee was by them persuaded that the defeat of the Moghul troops had been arranged between the rebels and the Afghan chief. Rustam-khan was therefore coaxed to court, and thrown in prison. He was, after suffering great privations, released, on his three rivals promising to murder him.

Hajee Meer Wais excused himself from being the executioner, on the plea, that should his Sadozye co-adjutors commit the deed, a bloody feud in that tribe would be the result, which would be favorable to the Persian power.

Izzat was also found to have some spark of patriotism left, and therefore Attal became the murderer, some say, partly in revenge for the death of his uncle, Jafar Sultan.

Rustam-khan only ruled four years, and left no issue. His tomb is also in the Razabagh, at Kohak, near Candahar. Mahammad Zaman-khan was at this time in Kirman.

Hajee Meer Wais-khan was the son-in-law of Jafar Sultan Sadozye Kamran-khelee. Doulat-khan had Meer Wais' father as a hostage. In Jafar Sultan's time his wife, by name Durkhee, gave her daughter, Khanzad, to Meer Wais, and it is said that one of the objects of Hajee Meer-khan's visit to Ispahan was to get the chiefship of the Abdalees for his brother-in-law.

In the insurrection organized by Hajee Meer Wais-khan, after his return from Persia and Mecca, in which the Beglar-begee, Shahnawaz-khan, was murdered. The Abdalees cordially co-operated in the understanding that, if successful, they were to share power, lands, treasures, &c.

equally with the Ghiljyes. This latter party, however, played them false, and the Abdalees took arms. A great battle was fought between the rival tribes near Algabad in the Dasht-i-Boree, in which the Ghiljyes were victorious, and the Abdalees, under Sadulla-khan Sadozye, retired to Herat, of which they became masters by profiting by the dissensions inside. Others say, that one Allaiyar-khan was the Sadozye chief, who got possession of the citadel of Herat by disguising some fifty followers as merchants with a caravan.

Shah Mahmood Ghiljye, the son and successor of Meer Wais, it is said, made an attempt to take Herat from the Abdalees, and for that purpose advanced to Nawah on the Helmand, where he was met by the Herat force under Sadulla. A battle ensued, in which the latter was killed, and Shah Mahmood returned to Candahar. He next year again advanced on Herat, as far as Giranee, on the Farrah Rod. Here he was met by a deputation from Herat sent by Sadulla's mother, who was a sister of his mother, * which induced him to change his plans and to proceed *viâ* Seistan to Kirmam.

By the other account Allaiyar-khan is said, after getting possession of Herat, to have put his brother Zuman-khan and all his sons to death, and that Ahmad alone escaped, by being an infant in the cradle. His mother, who was an Alakozye, took him to Hajee Ismail Aleezye, the Beglar-begee of Herat, and, by promising him her daughter for his son, got him to intercede with Allaiyar to spare the infant's life. Hajee Ismail shewed the child to his Peer, a spiritual father, Mulla Usman, an Alakozye Akhund, who foretold that he would be favoured of God.

On Ahmad growing up, many of the Abdalees flocked to him, which causing Allaiyar uneasiness, he had them all put to death: and Hajee Ismail had his protégé conveyed to the neighbourhood of Subzwar and Farrah, and there kept concealed. Allaiyar-khan's wrath was thus turned on the Hajee whom he was waiting the first favorable opportunity of killing, when Nadir Shah appeared in the field and attracted the attention of all Khorasan.† Mulla Usman was called upon to foretell events; which

* Khanzad was Mahmood's mother, and Sadulla's mother must by this have been a second daughter of Durkhee and Jafar Sultan.

† My Aleezye informant makes Allaiyar the governor of Herat about this time, while a descendant of Shah Husen assures me that his name was Sadulla. Again, that Mahammad Zuman-khan was once governor of Herat there is no doubt, his tomb is now there. In the History of Persia, Mahammad-khan, the governor of Herat, is mentioned as having been sent by the king of Persia with overtures to Meer Wais on

he did, by assuring them that 6,000 Afghans would be led into captivity by the Persian conqueror, and that this visitation of the Almighty's wrath was caused by the cries of one poor Noorzye shepherdess, who in vain entreated her harsh mistress to give her in-door work, instead of the hunger and cold of the bleak mountains. In the course of time, Nadir Shah appeared before Herat, which he besieged for fourteen months, leading into captivity 6,000 Afghans, men and women, which he distributed throughout the town of Persia, employing the boldest and most able-bodied in his army.

Their chiefs at this time were Ghanee-khan Alakozye, and Noor Mahammad-khan Alezye.

Nadir Shah had been besieging Daghistan for eleven months without success, and his temper became accordingly soured, when one day a shot from the besieged ramparts was so admirably thrown as to fill the dishes Nadir Shah was dining off in his tent with dust. This gave the climax to his wrath; and he ordered the chiefs of the captive Abdalees to be summoned. Among them, besides the two above-mentioned, were Hajee Jamal-khan Mahammadzye, and Janoo and Manoo-khans Noorzyes. Nadir Shah informed them, swearing by Sultan Alee Moosa, that they would all be massacred should they fail in becoming masters of the fortress within twenty-four hours.

The Abdalees seeing their case desperate, swore to die like men, and sent a communication to the besieged, desiring them to evacuate the fortress within six hours, which, being of course laughed at, the Abdalees prepared for the attack. This was so sudden and so desperate—the Abdalees still passing on over the dead bodies of 600 of their brethren—as to inspire the besieged with a sudden panic, which did not subside until they had gained the outside of the fort in their retreat. Nadir Shah was so pleased, that he ordered the Abdalees to ask any favor of him. "Revenge us on the Ghiljyes of Candahar, and give us their lands," was their first request, and "release our captives," was their second. Both were granted, and orders were given to collect the Af-

his insurrection. Again, it is mentioned that in the time of Shah Mahmood Ghiljye of Candahar, the Uzbecks invaded Khorasan, and were joined by Azadullah (Sadulla?) Duranee chief of the Hazarajat, who had been formerly dependent on Herat, but who had been estranged by an insult offered him by the governor of Herat, Mahammad Zuman-khan. A Persian force of 30,000 men advanced to Herat, and defeated the Uzbecks; but was in its turn defeated by the Afghans, 15,000 in number, under Azadulla, who retained possession of Herat and its dependencies.

ghans from all parts of Persia; wives were restored to their husbands, and daughters to their fathers: only one Aleeye was left to mourn a wife, who in his grief sought his chief, Noor Mahammad-khan, who had the title of Meer-i-Afghan. Every diligence was made in searching for her, and she was at last discovered to be in the harem of Nadir's own son. Noor Mahammad, emboldened by the past favors of that monarch, represented the case to Nadir Shah at his next interview, who thought to keep his word, and at the same time avoid the disgrace of a lady who had once entered Nadir's harem leaving it, by promising that she should accompany her former husband back to his country, if she should be so inclined; calculating that the delicate food and rich attire, &c. &c. that she had been accustomed to in his harem would disgust her with her rough and greasy husband. In this Nadir was disappointed, for in the interview allowed the couple on the Afghan appealing to her to enable him to hold up his head again among his "Siyal," (equals in society,) she decided for returning home. This the king allowed her to do with all the goods and chattels she had become possessed of.

On Nadir Shah's marching on Candahar, Allaiyar opposed him at Sabzwar, and was killed.

Hajee Ismail was sent for by Nadir, and ordered to bring Zaman-khan's son to the presence. This he did after Nadir had sworn that he would not injure him.

It is said, that on Ahmad-khan first making his appearance before Nadir Shah, the latter was so forcibly struck with a presentiment that he would be king, as to have required an oath from him that he would not molest his descendants.

He ordered him to be in constant attendance, and conferred on him a golden staff set with jewels.

On Nadir Shah taking Candahar, the Afghans reminded him of his promise regarding the Ghiljye lands. Ghanee-khan Alakozye got the rich valley of the Arghandah for himself and tribe, while Noor Mahammad-khan secured the fertile valley of Zemindawer for his Aleeyes. The Barikzyes of the present day in pointing to the high and dry lands that fell to their lot, bitterly regret that they were at that time not properly represented at Nadir's court.*

* Nadir Shah divided Candahar into 3000 kulbahs, which he called Arbabee: each kulbah containing 100 tanabs, and each tanab being 60 yards square. From each kulbah of these Tavelee lands sown by four kharwars (40 maunds) seed, he required

Ahmad-khan accompanied Nadir Shah in all his campaigns, and was present in camp at the time of that monarch's murder. How he succeeded in becoming Ahmad Shah by means of one of Nadir Shah's cash remittances from Hindustan that fell into his hands, belongs to his own history, and nothing is left to note but the patriotism of Nadir's old Afghan officers.

On their being summoned to the upstart court of Ahmad Shah, to give their advice for the consolidation of the rising Duranee* power, "First," was their reply, "raise a body of 12,000 foreign Persian troops as your ghulam-khanahs (slaves of your will,) as a check upon your Duranees; and, secondly, have *us* put to death, as we are too powerful, and stand in your way."

Their advice in both cases was taken by Ahmad Shah!

two horsemen. He gave the outskirt lands in Tavel to the Duranees, and the rich suburb lands he assessed at one-tenth of the produce, after the following unfair experiment in the lands under the walls of Candahar, which had on account of preceding anarchy lain fallow for three years, whereas the land was always deemed and termed "doo lish," that is, two kulbahs were alternately cultivated year about. He appointed his own men to sow one kulbah with five kharwars of seed after ploughing it seven times; and because the outturn was 100 kharwars, he unfairly made a fixed settlement of one-tenth, being ten kharwars grain, and ten kharwars straw (bhoosah.) The Afghan's hereditary lands are called mouroosee or kosai.

* Ahmad Shah assumed the title of Dur-i-Duran, "pearl of pearls," notwithstanding his Peer, or spiritual adviser, suggested Dur-i-Douran, "pearl of the age."

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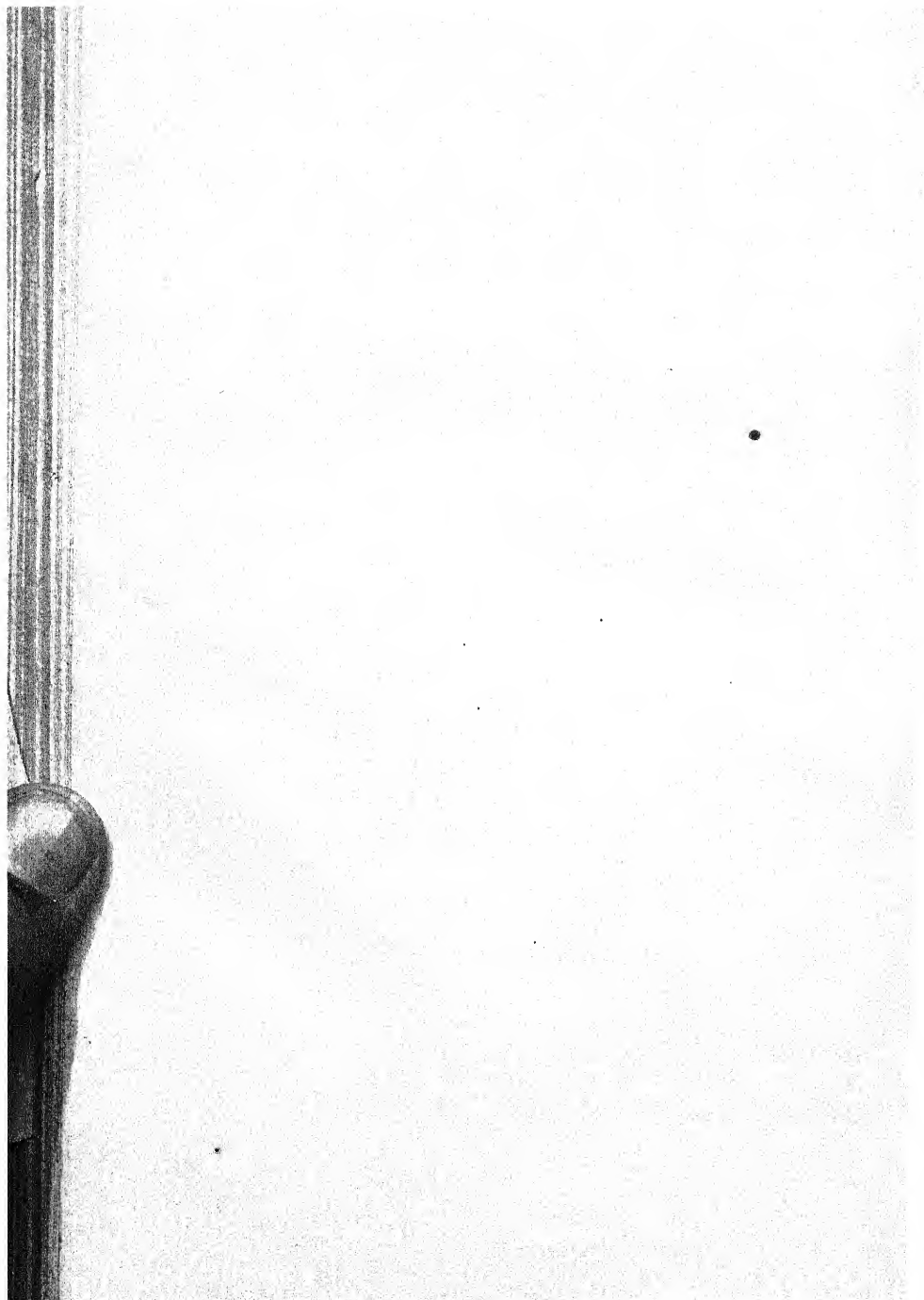
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Lassen, Gita Govinda, Sanscrit et Latine. Bonnæ ad Rhenum, 1836, pages 180, 4to.	2	8
Chezy, Yajnadattabada, ou La Mort D'yadjnadatta, Text, Analysis and Translation. Paris, 1826, pages 142, 4to.	3	8
Chezy, La reconnaissance de Sacountala, Text and Translation. Paris, 1830, pages 665, 4to.	10	0
Geographie D'Aboulféda, Texte Arabe. Paris, 1837-40, pages 586, 4to.	8	0
The Travels of Ibn Batuta, translated from the Arabic Manuscript, by S. Lea. London 1829, 143 pages, 4to.	6	0
The Travels of Macarius, translated by F. C. Belfour. London, 1829, pt. I. 114 pages, 4to.	4	0
Memoir of the Emperor Jehanguire, translated from the Persian Manuscript, by Major D. Price. London, 1829, 141 pages, 4to.	4	0
History of the Afghans, translated from the Persian, by B. Dorn, part I. London, 1829, 134 pages, 4to.	5	0
Han-Koong-Tsew, or the Sorrows of Han, a Chinese Tragedy, translated by J. F. Davis. London, 1829, 23 pages, 4to.	1	8
Vocabulary of Scinde Language, by Capt. Eastwick.	1	0
Leech's Grammar and Vocabulary of the Baloochi and Punjabee Languages.	1	0
Points in the History of the Greek and Indo-Scythian Kings, &c. Translated from the German of Professor Lassen, by J. H. E. Roer, and Edited by H. Torrens, Esq.	5	0

 Separate articles of the Journal are also re-printed, and sold at proportionate rates.

Proceedings of the Asiatic Society for the month of JANUARY, 1845.

(And at its supplementary Meeting of 1st February, 1845.)

The monthly meeting of the Society took place at the usual hour, at the rooms, on Tuesday evening, the 14th January.

The Rev. Dr. Hœberlin, in the Chair.

The following gentlemen, proposed at the last meeting, were ballotted for and declared duly elected.

F. Boutros, Esq. Dehli College ; A. Christopher, Esq. La Martiniere ; S. B. Bowring, Esq. C. S. ; John Ward, Esq. Civil Engineer ; E. Blyth, Esq. Associate Member.

And the following new members were proposed : Major Lawrence, Resident, Nepal, proposed by H. Torrens, Esq. seconded by the Sub-Secretary ; Rev. Peter Barbé, proposed by H. Torrens, Esq. seconded by the Sub-Secretary.

The Society's Office-bearers for 1844 were unanimously re-elected for 1845, and the following gentlemen were added to their number,—

As Vice-President, Lieut. Col. W. N. Forbes, B. E.

As members of the Committee of Papers,

W. Seton Karr, Esq. C. S.

W. B. O'Shaughnessy, Esq. B. M. S.

On the motion of the Secretary, H. Torrens, Esq. seconded by F. G. T. Heatley, Esq. it was resolved,

That the following gentlemen be requested to act as Corresponding Members of the Committee of Papers,—

V. Tregear, Esq.

A. Sprenger, Esq. M. D.

Captain Boileau, B. E.

G. G. Spilsbury, Esq. M. D.

Lieut. Phayre, B. N. I.

Lieut. Tickell, B. N. I.

Captain Cunningham, B. N. I.

And that the Committee of Papers be empowered from time to time to add to the foregoing the names of such gentlemen as it may deem likely to assist in its labours.

It was further resolved, that the hour of meeting in future be *half past seven* instead of *half-past eight*, P. M.

Read the following list of books.

Books received for the Meeting of the Asiatic Society, Tuesday, January 14, 1845.

Presented.

The Holy Bible in Hindustanee, by Rev. Mr. Long.

The New Testament in Bengalee and English, Matthew to John, by do. do.

- Hindustanee Pentateuch, by the Rev. J. Long.
 Hindee New Testament, by do. do.
 New Testament in Bengalee, by do. do.
 Psalms of David in Bengalee, 2 copies, by do. do.
 A number of Bengalee tracts, by do. do.
 Usher's Works, Vols. II. to XIII. by the Dublin University.
 Livius ed. Walker, 7 vols. by do. do.
 Wall on the Antient Orthography of the Jews, 3 vols. by do. do.
 H. Lloyd's Treatises on Light and Vision, 1 vol. by do. do.
 Lectures on the Wave-Theory of Light, 1 vol. by do. do.
 B. Lloyd's Mechanical Philosophy, by do. do.
 Todd's Discourses on the Prophecies relating to Antichrist, 1 vol. by do. do.
 Proceedings of the Irish Archæological Society, by the Society.
 Journal of Great Britain and Ireland, No. 13, by the Society.
 Proceedings of the Royal Asiatic Society for 1844, by the Society.
 Bullétin de la Société de Géographie. Tome 20. Paris, 1843. By the Society.
 Journal of the Agricultural and Horticultural Society of India, vol. iii, part iii, by the Society.
 Specimen e Litteris Orientalibus, exhibens Taalibii Syntagma. Auct. J. J. Valetton, by the Academy of Leyden.
 Edinburgh New Philosophical Journal, No. 73, April to July 1844, by the Editor.
 Calcutta Christian Observer, January 1845, by the Editors.
 North British Review, No. 1, May 1844, by the Rev. Dr. Wilson.
 Akademischer Almanach der Baierischen Akademie der Wissenschaften für das Jahr 1844, by Professor v. Martius.
 Oriental Christian Spectator, for December 1844, by the Editor.
 Documents et Observations sur le Cours du Bahr el Abiad, par M. D'Armand.
 Second Voyage ditto ditto, two copies.
 Collection Géographique de la Bibliothèque Royale.
 Glossarium Sanscriticum, auct. F. Bopp. Fasciculus II. Berolini, 1844, by the author.

Exchanged.

- Journal Asiatique, No. 13, April, 1844.
 The Athenæum, Nos. 884—888, 19th Oct. to 2nd Nov. 1844.

Purchased.

- Haji Khalfæ Lexicon, 1 vol. printed for the Asiatic Society by the Oriental Translation Fund.
 Lettre sur l'utilité des Musées ethnographiques, par Ph. Fr. de Siebold, Paris, 1843.
 Journal des Savants, June, 1844.
 Philosophical Magazine for July, No. 162. Supplement to D. D. No. 163, and for Aug. 1844, No. 164.
 Lardner's Cabinet Cyclopædia, History of Greece, by C. Thirlwall, vol. 8.

It was resolved, that the Society subscribe to the North British Review.

Read the following letter from the Librarian of Trinity College, Dublin :—

To the Vice President of the Asiatic Society of Bengal.

SIR,—I am directed by the Provost and Senior Fellows of Trinity College, Dublin, (in pursuance of the answer which they commissioned the Vice Chancellor of the University of Dublin to make

to your letter to him, dated last September) to forward to you for presentation to the Asiatic Society of Bengal, the works noted on the other side.

I have the honor to be, Sir,
Your obedient servant,

CHARLES WM. WALL,
Librarian.

Trinity College, Dublin, July 8, 1844.

Archbishop Usher's works, edited by Charles R. Ebrington, D. D. Regius, Professor of Divinity in the University of Dublin, Vol. II. to XIII. inclusive (Vol. I. XIV. &c. not yet published)

An examination of the Ancient Orthography of the Jews. By Charles William Wall, Senior Fellow of Trinity College, and Professor of Hebrew in the University of Dublin, Vols. I. II. and III.

Discourses on the Prophecies relating to Antichrist in the writings of Daniel and St. Paul. By James Henthron Todd, M. R. I. A. Fellow of Trinity College, Dublin.

A Treatise on Light and Vision. By the Rev. Humphrey Lloyd, M. A. Fellow of Trinity College, Dublin.

An Elementary Treatise of Mechanical Philosophy. By Bartholomew Lloyd, D. D. Provost of Trinity College, Dublin.

Lectures on the Wave Theory of Light. By the Rev. H. Lloyd, D. D.

Livius, a John Walker, 7 Vols.

Read the following letter from the Librarian :

To H. TORRENS, Esq. *Secretary, Asiatic Society.*

SIR,—I have the honor to submit to you an alphabetical list of the books received during the past year into the Library, together with the account sales of the Oriental publications, and an account of the publications delivered, sold and in store, from the 31st of July 1843, to the 31st of December 1844.

From the alphabetical list it appears, that the number of works received, is nearly the same with that of the preceding year.

I beg, however, to observe, that most of these works bear upon Natural History and Natural Science in general, while a few only are connected with Oriental Researches. Although it is very desirable, that the library of the Asiatic Society should contain standard works on natural sciences, the Oriental division, which is so closely linked with the objects of the Society, should not be neglected. I therefore beg to propose, that the Society may be pleased to fix an annual sum of some hundred rupees to enable the Librarian to improve the collection of Oriental works in the Library.

I have the honour to be, Sir,
Your most obedient servant,

14th January, 1845.

E. ROER.

Abstract of the List of Books received into the Library during 1844.

Academy of Natural Sciences of Philadelphia. Transactions, vol. ii. January and February 1844, No. 1.

Ditto ditto Proceedings, Nos. 30-33.

Agricultural and Horticultural Society of India, Journal, vol. 2, Nos. 11-12, vol. 3, Nos. 1-2.

Annals and Magazine of Natural History, Nos. 77-83 and Nos. 85-89.

Athenæum, Nos. 855-858, and Nos. 861-863.

Ayeen Akbery, or the Institutes of Akber, translated by Gladwin, 2 vols.

Bombay Branch Royal Asiatic Society. Journal, No. 7, 1844.

Botanical Society of London, 1839, vol. i.

British Association for the Advancement of Science. Report for 1843.

Calcutta Christian Observer, vol. v. 1844, from January to December, 12 Nos.

- Calcutta Literary Gleaner, vol. ii. Nos. 10-11.
 Classical Museum of London, 1844, Nos. 2-5.
 Forster, (C.) *Historical Geography of Arabia*. London, 1844, 2 vols.
 Gayangos, (P. de) *History of the Mahomedan Dynasties in Spain*, vol. ii. London, 1843.
 General Report on Public Instruction in the Bengal Presidency, for 1842-43, 1 vol.
 Geological Society of London, *List of the Members for 1843*.
 ——— *Proceedings*, vol. 14, No. 96, and Index to vol. 3, No. 93.
 Gollingham, (J.) *Meteorological Register at Madras*.
 Goodwyn, (H.) *Memoir on Iron Roofing*, Calcutta, 1844.
 ——— *Ditto ditto plates*.
 Grey, (Hamilton) *History of Etruria*, part 1, 1 vol.
 Griffith, (W.) *the Palms of British India*.
 Heeren, (A. H. L.) *Manual of Ancient History*. Third edition. Oxford, 1840.
 Jameson's *Edinburgh New Philosophical Journal*, Nos. 69-72.
 Jeffroy, (A.) *Notes on the Marine Glue*. London, 1843, Pamphlet.
 Jerdon, *Illustrations of Indian Ornithology*, No. 1, Madras 1843.
 Johnston, (K. M.) *Report of the Secretary of the Navy*.
 Jones, (J. T.) *Brief Grammatical Notices of the Siamese Language*.
 Lardner, (D.) and Walker *Cabinet Cyclopædia. Electricity*, vol. ii. 1844.
 London, *Edinburgh and Dublin Philosophical Magazine and Journal of Science*, vol. 22, Nos. 147, 148; vol. 23, Nos. 159, 150, 153, 185; vol. 24, Nos. 156, 161.
 M'Clelland (J.) and W. Griffith, *Calcutta Journal of Natural History*, 4 vols. Nos. 1-16, and Nos. 17, 18.
 Madras *Journal of Literature and Science*, No. 30, June 1844.
 Magnetic Observations from the Observatory of Bombay.
 Naturalist's Library, *Ichthyology*, vol. 6, *British Fishes*, *Ornithology*, vol. 14, *British Birds*, 2 vols.
 Napier, (W. F. P.) *History of the Peninsular War*, vols. 3-5.
 Niebuhr (B. G.) *History of Rome*, vols. 4, 5.
 Oriental Christian Spectator, vol. 4. No. 12. Second Series, Nos. 1-11.
 Penny Cyclopædia, vols. 25, 26.
 Piddington, (H.) *Horn-book of Storms for the Indian and China Seas*, 1 vol.
 Prichard, (J. C.) *Natural History of Man*, 1 vol.
 Ditto ditto *Researches into the Physical History of Mankind*, vols. 1-4.
 Ram Chunder Doss, *General Register of the Bengal Civil Service*, from 1796-1842.
 Register of the Singapore Tides.
 Royal Asiatic Society of Great Britain and Ireland, 1843. *Annual Report of the Council*.
 Royal Geographical Society of London. *Journal*, vol. 14, part 6, 1843.
 Royal Irish Academy. *Transactions*, vol. 19, part ii.
 Ditto *Proceedings*, 1841-42, part 6; 1842-43, part 7.
 Royal Society of Edinburgh, vol. 15, part 2nd, 3rd Series.
 Royal Society of London, *Philosophical Transactions*, from 1838-43, 6 vols. and part i. for 1844.
 Shea, (and Troyer) *Dabistan, or School of Manners*, translated from the Persian.
 Sketch of the Systems of Education, moral and intellectual, in practice at Bruce Castle School, Tottenham, London, 1839, 1 vol.
 Slane, (Mac G. de) *Ibn Khalikan's Biographical Dictionary*, translated from the Arabic, vol. ii, Paris 1843.
 Smith, (A.) *Illustrations of the Zoology of South Africa*, Nos. 18, 19.
 Society of Arts, *Transactions*, vol. 54.
 Society for the Encouragement of Arts, Manufactures and Commerce, premium for the sessions 1843-44.
 Somerby, (B.) *Thesaurus Conchyliorum, or figures and descriptions of shells*. 1842-43.

Somerby, *Conchologia Iconica*, a Repertory of species of shells, pictorial, descriptive. London, 1843, 3 vols.

Taylor, (G. P. G.) General Catalogue of the principal fixed stars, from observations made at Madras in 1830-1843.

Troyer, Vide Shea.

Vetch, Inquiry into the manner of establishing a steam-navigation between the Mediterranean and Red Seas, London, 1843.

Wiseman, Letter on science and revealed religion.

Wood, (W.) Catalogue of a valuable collection of books in Natural History, arranged in classes according to the Linnean system.

Zoology of the voyage of H. M. Ship "Sulphur," during the years 1836-1842.

French.

Annuaire du Bureau des Longitudes, 1842, 1 vol.

Accroissement de la collection Géographique de la Bibliothèque Royale, 1841.

Bureau des Longitudes. Connaissance des temps des mouvements célestes pour, 1843-45, 3 vols.

Florival, (P. C. V. de) Moise de Khorene, texte Arménien et introduction Française, 1844, 2 vols.

Humboldt, (A. de) L'Asie Centrale. Paris, 1843, 3 vols.

Journal des Savants, Paris, April, 1843 to Aug. 1844.

Jomard, Notation Hypsométrique, P.

Mas, (S. de) Mémoire Sur l'idéographie Macao. 1844—P.

Ditto ditto, Vocabulaire l'idéographique, P.

Quatremère Histoire des Sultans Mamlouks de l'Egypte. Tom. II, Paris, 1842.

Rafn, (Chr.) Mémoire sur la Découverte de l'Amerique. Copenhagen 1843, 1 vol.

Roberts, (G.) Voyage de Delhi à Bombay en 1841, 1 vol.

Société Asiatique, Journal 3 me. Série. Nov. Dec. 1842, Tome 4. 4 me. Serie vols. 1-3.

Société de Géographie. Bulletin 2 me. Série. Tomes 18-19. Paris, 1842-43.

Ditto ditto, Extract du Rapport Annuel, 1839.

Société Physique et d'Histoire Naturelle de Genève Memoires, 1841-42, 1 vol.

Société Royale d'agriculture de Lyon.

Annales des Sciences Physiques et Naturelles 1838-1840, 3 vols.

Société Royale des antiquaires du Nord, section Asiatique, mémoires, 1842-43, Copenhagen.

Tassy, (G. de) Saadi Paris, 1843,—P.

Walkenaer, (Baron de) Notice Historique sur la vie et les ouvrages de Major Rennell,—P.

Italian.

Hemsö, (G. de) Ultimi progressi de la Geografia. Milano 1843.—P.

Informe Sobre el Estado de las Islas Filipinas an 1842 Madrid 1843, 2 vols.

German.

Koenigliche Gesellschaft für die nordische Alterthumskunde. Jahresversammlung, 1842.

Lassen, (Ch) Zeitschrift für die Kunde des Morgenlands. Sechsten Bandes erstes Heft, 1844.

Leitfaden zur nordischen Alterthumskunde. Copenhagen 1837.—P.

Danish.

Annaler for nordisk old kyndighed, 1840-41, vol. I. 1842, 1843.

Latin.

Lassen, (Chr) de Taprobane Insula, veteribus cognita, dissertatio. Bonae, 1842.—P.

Hindoostanee.

Rafiel Hishab, 1 vol.

Zend.

Framje Aspiandiarjei; The Zaina of the Parsis with Guzarati translation, paraphrase, and comment, 1843.

Sanskrit.

Yates, (W.) Nalayodaya by Kalidasa. Text and Translation. Calcutta, 1844, 1 vol.

Oriental Publications, &c. sold from the 1st of January 1844, to the 31st December, 1844.

	Rs.	As.	Ps.
Mahabharata, vol. I. 6 copies, vol. II. 6 do., vol. III. 6 do., vol. IV. 7 do. ...	260	0	0
Index to ditto, vol. I. 5 copies, vol. II. 5 do., vol. III. 5 do., vol. IV. 5 do. ...	20	0	0
Harriwansa, 9 copies, ...	45	0	0
Raja Tarrangini, 7 copies, ...	35	0	0
Naishada, 18 copies, ...	108	0	0
Sausruta, vols. I and II. 8 copies each. ...	64	0	0
Fatawe Alemgiri, vol. I. 2 copies, vol. II. 2 do., vol. III. 2 do., vol. VI. do., vol. V. 8 do., vol. VI., 8 do. ...	248	0	0
Inaya, vols. 2-4. 2 copies each, ...	64	0	0
Khazanat ul Ilm ul Riazi, 6 copies, ...	48	0	0
Fawame ul Ilm ul Riazi, 6 copies, ...	24	0	0
Anis ul Musharrahin, 2 copies, ...	10	0	0
Sharaya ul Islam, 4 copies, ...	32	0	0
Epitome of the Grammar of the Beloochee languages, 1 copy, ...	1	0	0
Essay sur le Pali, 1 copy, ...	3	0	0
Anthologia Sanscritica, 2 copies, ...	8	0	0
Géographie d'Aboulfeda, 3 copies, ...	15	0	0
Macarius's Travels, 1 copy, ...	4	0	0
Memoir of Jehanguire, 2 copies, ...	8	0	0
History of the Afghans, 2 copies, ...	10	0	0
Travels of Ibn Batuta, 1 copy, ...	6	0	0
Lassen's Gita Govinda, 1 copy, ...	2	8	0
Lassen's Institutiones, 1 copy, ...	6	0	0
Asiatic Researches, vol. 16. 1 copy, vol. 19. p. I. 1 copy, p. II. 2 copies, vol. 20 p. I and II. 1 copy each, ...	40	0	0
Asiatic Journal, 8 Nos. ...	14	8	0
Total, Rupees, ...	1,076	0	0

ABSTRACT.

Account of the Oriental Publications delivered, sold, and in store, from 31st of July 1843, to December the 31st, 1844.

Mahabharata.

	Vols.	I.	II.	III.	IV.
Found, ...	Copies,	218	233	254	282
Delivered and Sold, ...	"	20	20	26	21
Balance, ...		198	213	238	261

Index to Mahabharata.

				Vols.	I.	II.	III.	IV.
Found, ...	...	...	...	Copies,	392	396	392	323
Delivered and Sold, ...	...	...	...	"	73	73	73	18
Balance, ...	...	...	...		320	323	329	305

Harriwansa.

Found, ...	...	...	...	...	...	Copies,	469
Delivered and Sold, ...	...	...	...	...	...	"	20
Balance, ...	...	...	...	...	...	...	449

Raja Tarangini.

Found, ...	...	...	...	...	...	Copies,	275
Delivered and Sold, ...	...	...	...	...	...	"	10
Balance, ...	...	...	...	...	...	...	265

Naishada.

Found, ...	...	...	...	...	...	Copies,	197
Delivered and Sold, ...	...	...	...	...	...	...	30
Balance, ...	...	...	...	...	...	...	167

Sausruta.

					Vols.	I.	II.
Found, ...	...	...	...	...	Copies,	261	308
Delivered and Sold, ...	...	...	...	...	"	18	18
Balance, ...	...	...	...	...	...	243	243

Sanscrit Catalogue.

Found, ...	...	...	...	...	...	Copies,	255
Delivered and Sold, ...	...	...	...	...	...	"	6
Balance, ...	...	...	...	...	...	...	249

Fatawe Alemgiri.

					Vols.	I.	II.	III.	IV.	V.	VI.
Found, ...	...	...	...	...	Copies,	81	91	97	76	118	129
Delivered and Sold, ...	...	...	...	...	"	12	12	12	24	25	24
Balance, ...	...	...	...	...	...	69	79	85	52	93	105

Inaya.

					Vols.	II.	III.	IV.
Found, ...	...	...	...	...	Copies,	35	28	30
Delivered and Sold, ...	...	...	...	...	"	12	12	12
Balance, ...	...	...	...	...	...	23	16	18

Khazanat ul Ilm.

Found, ...	...	...	...	...	...	Copies,	385
Delivered and Sold, ...	...	...	...	...	...	"	16
Balance, ...	...	...	...	...	...	...	369

Fawane ul Ilm ul Riazi.

Found, ...	...	...	...	...	...	Copies, 393
Delivered and Sold,	...	...	...	...	...	„ 16
Balance,	...	...	...	...	...	377

Anis ul Musharrahin.

Found, ...	...	...	...	...	...	Copies, 316
Delivered and Sold,	...	...	...	...	...	„ 12
Balance,	...	...	...	...	...	304

Sharaya ul Islam.

Found, ...	...	...	...	...	...	Copies, 314
Delivered and Sold,	...	...	...	...	...	„ 16
Balance,	...	...	...	...	...	298

Persian Catalogue.

Found, ...	...	...	...	...	...	Copies, 238
Delivered and Sold,	...	...	...	...	...	„ 6
Balance,	...	...	...	...	...	232

Asiatic Researches.

		Vols.	3.	7.	8.	9.	11.	12.	13.	14.	15.	16.	17.	18.	18.	18.	19.	19.	19.	20.	20.	20.
Found, ...	3	1	3	2	1	5	30	47	56	98	213	69	151	46	26	96	235	12	129	141		
Delvd. & Sold,	0	0	0	0	0	1	1	1	2	1	0	0	1	1	1	3	1	1	2	1		
	3	1	3	2	1	5	29	46	55	96	212	69	151	45	25	93	234	11	127	140		

Tibetan Grammar.

Found, ...	...	...	...	...	...	Copies, 208
Delivered and Sold,	...	...	...	...	...	„ 11
Balance,	...	...	...	...	...	197

Tibetan Dictionary.

Found, ...	...	...	...	...	...	Copies, 205
Delivered and Sold,	...	...	...	...	...	„ 11
Balance,	...	...	...	...	...	194

Dictionarium Latino-Anamiticum.

Found, ...	...	...	...	...	...	Copies, 53
Delivered and Sold,	...	...	...	...	...	„ 11
Balance,	...	...	...	...	...	47

The Catalogue accompanying this letter was ordered to be published in the Proceedings, and upon the proposal of the President, seconded by the Secretary, it was resolved, that a supplementary Catalogue, to comprise all the works received since the last Catalogue of the Library was printed, be also prepared and printed.

Read the following letter also from the Librarian :—

To H. TORRENS, Esq., Secretary, Asiatic Society.

SIR,—I beg leave to inform you, that I can procure the second volume of Strange's "Elements of Hindoo Law," and the first volume of Crawford's "Indian Archi-

pelago at 8 and 5 rupees respectively. As the original price of *Strange's Elements* is 11 rupees per volume, and of *Crawford's Indian Archipelago* 8 rupees per volume, will you authorize me to purchase those volumes for the Library, in order to complete the above mentioned works.

I take this opportunity to submit to you the following list of valuable Oriental works, which I would suggest should be purchased for the Library :—

1. *Die Zigeuner in Europa und Asien*, von Dr. A. T. Pott. Erster Theil. Halle. 1844.
 2. *Kammavakya*, liber de officiis sacerdotum Buddhicorum. Police, Latine. Auct. Fr. Spiegel.
 3. Chr. Lassen, *Indische Alterthums-Kunde*. Ersten Bandes erste Hälfte.
 4. *Panini's Acht Bücher grammatischer Regeln*, von Otto Böthlinck. 2 Bände.
 5. *Radices Linguae Pracriticae*. Ed. N. Delius.
 6. *Radices linguae Sanscriticae*. Ed. N. L. Westergaard.
 7. Böthlingk, (D.) *Erster Versuch über den Accent im Sanscrit*.
 8. *Die Declination im Sanscrit*.
 9. *Unadi Affixe*.
 10. 5 Upanishads aus dem Yayur, Samu and Atharva-Veda. Herausgegeben von L. Paley.
- 14th January, 1845. E. ROER.

Resolved—That the Secretary and Librarian be authorized to purchase these works as occasion may present. The work of Count Bijonsterna, entitled *Theogony*, *Cosmogony*, and *Philosophy of the Hindoos*, was also specially ordered to be obtained for the use of the Archaeological Committee.

The Secretary presented specimen copies of Abdool Ruzzak's work on *Suffee* terms, edited by Dr. Sprenger, of which those half bound were considered the best for the presentation copies.

The following note was read :—

MY DEAR SIR,—My friend Colonel Stacy of the 43rd Regt. having requested me to make over to the charge of the Curator of the Asiatic Society the accompanying ancient Hebrew MS., I have the pleasure to send it per bearer, and shall be favored by your acknowledging the receipt of it.

Ballygunge, 11th January, 1845. ROB. WROUGHTON.

The MS. to which it refers was handed to the Rev. Dr. Hæberlin, for examination and report.

Read the following letter and paper from the Secretary to the Government of Bombay :—

(No. 3656 of 1844.)

To the Secretary to the Asiatic Society of Calcutta.

General Department.

SIR,—I am directed by the Honorable the Governor in Council of Bombay to request the acceptance by the Asiatic Society of Calcutta, of the accompanying six

gold coins, discovered in the village of Heeolee in the Malwan Talooka of the Rutenagherry Collectorate, and at the same time to forward a copy of a descriptive memorandum by the Secretary to the Bombay Branch of the Royal Asiatic Society.

Bombay Castle, 12th December, 1844.

M. ESCOMBE,

Secretary to Government.

Notice by the Secretary of the Society on ten Hindie gold coins, found at the village of Hewli in the Southern Konkan, and presented by Government; also on a collection of gold Zodiac coins of the Emperor Jehangir.

The ten gold coins transmitted by Government, for the acceptance of the Society, weigh each — grains, and have generally, on one side, the figure of a lion, with an inscription below on Telagu letters, *Baliji Shri*, which may be translated prosperity to the *Bali*, and which are oblations of food offered, at the four cardinal points, to *Indra*, god of the firmament, *Yama* judge of the dead, *Varuna* the ocean, and *Soma* the moon.* Two of the coins are hammered, and quite plain on one side; having on the other, stamped symbols for the four preceding deities, indicated by letters, among which I recognize the Telagu letter *k* standing for *Yama*, and the cave *ch* for *Soma*. The centre symbol must therefore be intended for *Vivaswa*, or the sun. On the reverse of six of the coins we find written within a circle the word *Rudra*, a name for *Siva*; and on another of them, the Trisul, or emblem of *Siva*, with an inscription below in Deva Nagari or *Shrimanya Devaya श्रीमन्महेश्वराय* to the prosperous god; this last is the newest of the series, and indicates the establishment of the Saivite worship.

In the McKenzie collection of Hindoo gold coins, two of them are enumerated as the *Sinha Mudra Fanam*, or the *Fanam* with the lion impression, without any further information being given regarding them. These, and the ones now under consideration, may, with much probability, be assigned to the successors of the *Andhra* kings of Telingana, the *Narapati* sovereigns of Warangal; who appear to have been originally feudatories of the *Chalukya* kings of *Kalyani*. This family is known by the name of the *Kakataya* princes of Warangal, who at the commencement of their career, in the end of the eleventh century of our era, were *Jains*. Their original residence was *Ammakonda*, from whence, sometime after Sâl 1010, A. D. 1088, these princes removed to Warangal, which became their capital, and represented the chief Hindu state of Southern India, till destroyed by the Mahomedans during the reign of Ghias-ad-din Toghluq of Delhi, Hejirah 721, A. D. 1321. The then reigning Prince of Warangal is called, in Colonel Brigg's translation of Ferishta, *Sudder Dew*, being an evident mistake for his real name *Rudra Deva*; whose possessions appear to have been bounded on the North-west by those of *Rama*, Raja of *Devagiri*, the modern Daolatabad.

The coins now submitted for examination, having on the reverse the name of *Rudra*, may have been struck during the reign of the prince just mentioned; but there are good grounds for assigning them a higher antiquity, or the beginning of A. D. 1100, as at this time the second of the *Kakataya* princes of Warangal, named *Rudra Deva*, adopted the *Saiva* in place of the *Jain* faith, and built many temples to *Siva* or Ma-

* See perpetual obligations of a householder in Wilson's translation of the *Vishnu Purana*, Quarto, p. 302.

hadeva, in order to expiate the crime of having killed his father. Only one decisively Saivite coin appears in this collection, and is the most recent of the series; all the others indicating the prevalence of the *Jain* practice of astrology, and the worship of the *Bali* or *Baliah*, which are sidereal spirits.

(Signed,)

JAMES BIRD,

Secretary, Bombay Branch Royal Asiatic Society.

(True Copy,)

W. ESCOMBE,

Secretary to Government.

The Sub-Secretary stated, that he had received from Dr. Mouat the following letter, with the pamphlets therein alluded to. The pamphlets were ordered to be distributed to the Members of the Committee.

MY DEAR PIDDINGTON,—Mr. Latter, just before leaving for Arracan, requested to present the accompanying copies of his 'Note on Budhism' to the Asiatic Society, for the use of the Members of the Committee appointed to carry out the plans developed in the letter from the Honorable Court of Directors.

18th January.

FRED. J. MOUAT.

Read the following letters:—

(No. 3076.)

From the Under-Secretary to the Government of Bengal, to H. TORRENS, Esq. Vice President and Secretary to the Asiatic Society, dated Fort William, 11th December, 1844.

SIR,—With reference to your letter of the 7th March last, recommending on the part of the Asiatic Society, that certain books now in the Calcutta Public Library should be transferred to the charge of the Society, I am directed to forward, for the information of that body, the accompanying copy of a letter, dated the 4th ultimo, from the Curators of the Library.

At the same time, I am instructed to intimate that, though in the opinion of the Right Honorable the Governor, the existing arrangement cannot be fairly or properly disturbed without the consent of both Associations, yet His Excellency is inclined to think that, if the works in question are connected with Eastern Philology, they would be better placed in the Library of the Asiatic Society, than in the Public Library.

A. TURNBULL,

Under Secretary to the Government of Bengal.

From the Curators of the Calcutta Public Library, to A. TURNBULL, Esq. Under Secretary to the Government of Bengal.

SIR,—I have the honor to acknowledge, on the part of the Curators, the receipt of your letter, dated 15th April last, enclosing copy of a letter from the Vice President and Secretary to the Asiatic Society, and requesting us to report, for the information of Government, our willingness or otherwise to accede to the proposition for the transfer of the books therein alluded to, from the Calcutta Public Library to that of the Asiatic Society.

We beg at the same time to apologize for the delay which, by some singular accident, has occurred. With regard to the proposition of a transfer of the books, we beg to state, for the information of the Hon'ble the Governor of Bengal, that the books became the property of the Members of the Calcutta Public Library by a gift of the Bengal Government, confirmed by the Hon'ble Court of Directors, under certain engagements, which it is unnecessary at present to enter into, but which have been always complied with. As books of reference, we beg to observe that they are far more available to the public here than they can possibly be at the Library of the Asiatic Society, from the number of our subscribers, and the popular form of our Institution generally.

I am, &c.

(Signed) G. T. MARSHALL, *Curator,*
Chairman of the monthly meeting of Curators.
 (True copy.)

Metcalfe Hall,
4th Nov. 1844.

A. TURNBULL,
Under Secretary to the Government of Bengal.

Resolved—That the following gentlemen, viz. :—

Dr. ROER,
 Dr. GANTHONY,
 S. G. T. HEATLEY, Esq.

and H. TORRENS, Esq. as Secretary, be requested to form a Sub-Committee for considering what interchange might take place between the Society and the Public Library, as to duplicate works, without reference to subsequent arrangements.

Read the following letter addressed to the Geological Society of London, and it was agreed that it would be proper to despatch at the close of every year, one of the same tenor to every Society or Editor, whose works are regularly received by the Society.

The Secretary, Geological Society of London.

SIR,—I am directed to acknowledge the due and regular receipt of your Transactions and Proceedings by the Asiatic Society of Bengal, and to express to your Society our best thanks for the same. Should any irregularity in the receipt of the Journal or Transactions (Researches) of the Asiatic Society of Bengal occur, our London publishers and Agents, Messrs. Allen and Co., will readily explain or rectify it.

We have to request you will be good enough to transmit to them the numbers of your Proceedings, noted on the other side, and your bill for them, as the most part have probably been duly received by us, but are lost.

(Signed) H. TORRENS,
V. P. and Sec. Asiatic Society of Bengal.

Museum, 20th Jan. 1845.

Read the following extract of a letter from Captain Phayre, B. N. I. to the Secretary, dated Sandoway, 2nd December 1844.

MY DEAR TORRENS,—I hope, before long, that I shall be able to offer a treatise on Burmese Astronomy, from the pen of the Rev. Mr. Stilson, a Missionary here,

who is fully competent to the task. I am sorry the coins (the Persian part of them) are undecipherable; the fact is, the inscriptions must have been cut by some ignorant person in Arrakan, with a few Persian letters scrawled for the name of the thing. Are the gold coins (*Elephant type*) from Cheduba?

Sandoway, December 2, 1844.

The Secretary presented a paper from J. Middleton, Esq. C. S., being Observations on the specific Gravity of sea-water, which was referred to the Editors of the Journal for publication.

As it was already late, the President suggested that it might be advisable to call a supplementary Meeting for such business as remained, and for the reports of the Curators; which was agreed to, and Saturday the 1st February being considered as the most convenient day, it was named for that purpose.

For all the foregoing communications and contributions, the best thanks of the Society were accorded.

Proceedings of the Supplementary Meeting.

As above noted, the Supplementary Meeting of the Society was held on the 1st February, at 7½ P. M.—J. Fulton, Esq., Member Committee of Papers, in the Chair, when the reports of the Curators were read as follows:—

REPORT OF THE CURATOR, MUSEUM OF ECONOMIC GEOLOGY, AND GEOLOGICAL AND MINERALOGICAL DEPARTMENTS, FOR THE MONTH OF DECEMBER.

Geological and Mineralogical.—Our zealous and indefatigable contributor, Lieut. Sherwill of the Behar Revenue Survey, has sent us a most valuable geological map of Zillah Behar, with three chests containing upwards of 350 splendid sized specimens of the various rocks and minerals, numbered to the localities marked on the map. Lieut. Sherwill's notes to accompany the specimens have not yet arrived, but I have deemed it right to bring forward this magnificent contribution this evening, that we may have the pleasure of thanking him, as he so richly deserves, at the earliest possible moment. If the Society think with me, I should deem it right that it should, in such manner as may be thought proper, bring to the special notice of Government this meritorious instance of an officer voluntarily adding so highly and so valuably to his particular duties; of which we may, I think truly say, that there is no example yet on record. It must not be forgotten, that the officers of the Revenue Survey have no light task, and that this addition to our knowledge of his district has been made by Lieut. Sherwill probably in the hours of relaxation and repose. I trust that his notes, with what we can glean from Buchanan, will enable us to construct some good sections; in which case, imperfect as they may, and as every thing short of a regular geological survey, must be, it will still be the best geological notice of any separate Zillah in India, and an invaluable example to others; one indeed, which I feel assured the Society will not allow to pass by without all the honour in its power to bestow upon it.

I present now my detailed report on the Aerolite, presented by Captain J. Abbott, which was exhibited at the October meeting. I have put it in the form of a paper for

the Journal, as these phenomena are of special interest at home on many accounts, and our Aerolite is of a very rare kind.

I mentioned in my former report, that we had written to the Collector of Candeish, requesting his assistance in procuring further information of the Aerolite, and more specimens if obtainable. I have now the pleasure of submitting his reply, which is as follows. The report will be incorporated with my paper.

H. TORRENS, *Esq. Secretary and Vice-President, Asiatic Society.*

SIR,—I have now the pleasure to comply as far as in my power lies, with the request contained in your letter of the 23rd November last, and to send you five pieces of the Aerolite to which you allude, with a statement from the parties who witnessed the fall of it.

If in this or any other matter I can be of service by furnishing information, or otherwise forwarding the views of your Society, I beg you will freely command me.

Candeish, June 6, 1845.

J. M. BELL,

Collector of Candeish.

P. S.—The fragments of the Aerolite have been sent by bangy post; I shall be glad to hear that you have received them, and that they are of sufficient size to be of value.

Captain Latter, 67th B. N. I. has presented us with a very beautiful collection of minerals, being 128 good sized specimens and from first-rate dealers, (Mawe or Tennant ?) some of which will be handsome additions to our cabinet, and others serve to replace inferior specimens or to shew varieties. Captain Latter has added to this very handsome donation a considerable number of Geological and Mineralogical specimens from Algeria; including some of copper, from the lodes now working on the flanks of the lesser Atlas by the French! and fossils, &c. from the desert between Suez and Cairo.

We should also place on record the following extract of a polite letter from Capt. Baker, B. E., to whom I have written to say that we should be most obliged by any thing from such a locality.

Secretary to the Asiatic Society of Calcutta.

DEAR SIR,

I passed through Calcutta lately on my return from Scinde, and had hoped to present to the Society some geological specimens from that country; unfortunately, however, my baggage had not arrived before I was obliged to leave, and it may even be sometime before I have an opportunity of sending them.

On the arrival of my baggage, you will however receive two small boxes of fossils from Lieut. Blagrove of the Sinde Survey.

28th December, 1844.

W. E. BAKER, *Capt. Engineers.*

Museum of Economic Geology.—A specimen was handed to me at the meeting of January, marked as "a species of Asphaltum from the bed of the Namsay river near Jeypore, Upper Assam, presented by Mr. F. C. Marshall." It is unfortunately not Asphaltum, which will be a great treasure wherever it is discovered in any accessible locality in India, but cannel coal, apparently of a very fine quality. Our thanks are nevertheless equally due to Mr. Marshall for his very kind attention, and we shall be greatly obliged by specimens of everything he can send us; particularly if pitch-like or

earthy-looking substances of any kind, which melt and burn, and if they also effervesce with any acids, as strong vinegar or lime-juice, so much the better.

I have here also again the pleasure of referring to Lieut. Sherwill's active kindness in support of the objects of the Museum. I had written to him on the subject of the Corundum recently found and presented by Dr. Rowe, and in reply he sends us a set of specimens analogous to those which I had obtained from the bazar, but accompanied by the following very interesting account of the specimens and mines; which last were not known, I think, to exist in any locality north of the Nerbudda.

MY DEAR SIR,—I have succeeded after some trouble in getting you specimens of Corundum, from a locale little known to Europeans; they were obtained from a hill in Lat. $24^{\circ} 10'$, Long. $83^{\circ} 20'$, about 20 miles S. W. from Vantaree, behind the table-land of Rhotas, in a province known as Singrowlee. The mines are worked once a year, when enough is worked out to supply the wants of the Mahajuns, who send bullocks to convey it away. From this spot the greater part of Western India is supplied. The following Nos. apply to the Nos. on the specimens.

No. 1. Goolabee, named from its rose colour, is considered the best.

No. 2. Mussooreea, named from its colour, as resembling Mussoor-dal (*ervum lens*) is 2nd in quality.

No. 3. Bhakra, from being of many colours, (greyish?) 3rd in quality.

No. 4. Teleeya, named from its resembling in colour, the seed of the *telee*, 4th in quality.

No. 5. Considered impure, being mixed with scales of Mica.

No. 6. Very impure, being mixed with crystals of (Zeolite ?*)

In a short time I hope to be able to go to the spot myself, when you shall have a description of the place, rocks, &c. I *think* if you look amongst my Behar specimens you will find some corundum of the 1st or Goolabee quality, about No. 250 or 240.

Legend attached to the quarrying of the Singrowlee Mine.

"The rock, by the permission of the gods, is for one day, and one day only in the year, Corundum; during the remaining 364 days the rock is mere rock and of no earthly use." This is rather a clever story of the owner of the quarry! I should like very much to hear if you do find any Corundum amongst my Behar specimens.

W. S. SHERWILL.

We received some time ago from Captain Williams the following letter and notice, with the small fragments (of a few grains in weight only) referred to in it.

H. PIDDINGTON, Esq. *Assistant Secretary to the Asiatic Society of Calcutta.*

MY DEAR SIR,—I have had the pleasure to receive your letter regarding the Volcano near this place, and I will not fail to collect specimens of the stones, earth, &c. &c., on, and all around the hill, and send them up in the "Amherst."

As you have kindly offered me your services, I take the liberty of sending you four bits of stones sent out to me by a brother by the last Overland, who obtained them from a private in H. M. 4th Dragoons. It (the stone) is celebrated for its virtues in cleaning bridle bits, &c. and my brother wishes me to collect a quantity for him; but what the stone is, or where to be had, I am unable to find out, and shall feel obliged by your informing me. It appears from the Dragoon's memorandum that the natives of India (for he got it in this country) make idols of it. I fear the Dragoon is an *old*

* These are Fibrolite in small radiated nests.

soldier, and older traveller, and is imposing on my countrymen the untraveller Welsh. Please to return the stones.

Yours faithfully,

Kyook Phyoo, 14th July, 1844.

D. WILLIAMS.

The following Memorandum accompanied Major Williams's letter :—

Direction for polishing Iron and Steel.

“Take about two drams of Samy stone, put in a mortar, powder it as fine as possible, then put it on a slabstone, or what painters do mix their paint on, then rub it down with sweet oil, (N. B.—The best of oil,) until it be as fine as milk, the finest the best. Then take a new piece of strong cloth or thick flannel, then soak it with the above mixture. Rub your irons with it; afterwards take fine shamois' leather with rotten stone or whitening and chalk, and it will show the highest polish ever known. The same rag will last six months without failing. Never attempt to put fresh stuff on the old rag, for the stuff will remain on the rag as long as it may last if taken care of. Keep it from wet and strong heat.

“Samy stone is found in several places in the East Indies, but the best we found is at Bombay, and most plentiful; we paid from 1-3 to 2-6 of English money per pound for it in India. The inhabitants makes idols of it of different figures, and paints it in red. There is none to be got in England, except what is in our troop; you can get some home if you know any person in India, or a sailor that trades to that country, as it may be sent or bought without duty, &c. There is several grooms in England that had some home after they had the receipt from us. For the above receipt I had five pounds, never gave it before under ten rupees; I have sent you two small pieces, and you can try one for experience, the other you may keep to prove what you may get again: my stock is getting very short at present, else I should send you more of it. Received 5 shillings.

Newcastle, March 28th, 1844.

H. HALL, 4th V. O. L. D.”

As far as could be ascertained, from the small splinters I ventured to detach from the minute specimens sent, there is no doubt that the stone is a variety of Pagodite, which is almost all which can be pronounced of it now. I have carefully kept the remainder for comparison, and indeed have deferred reporting my examination of it, in the hope that some of the many persons to whom I have written would have been able to discover what this Samy stone—evidently *Swamy* (God) stone—is; but hitherto, I have heard of nothing approaching to it. The question nevertheless is of much interest, for the art of polishing metals is often one of high importance; and the use of an intermediate substance between the coarse polish of the Corundum or emery, brick or porcelain dust and the finishing effect of the rotten stone, as here described, is worth attention. The use of the common steatite in polishing, and as an anti-attrition ingredient has been long known; but the whole phenomena of polishing substances, and their effects on reflecting surfaces have yet been so little studied, that it is always proper that due weight be given to any fact which may lead to a useful practice.

The Secretary stated, that the suggestion of the Curator, respecting Lieut. Sherwill's labours, had been also mentioned at the regular Meeting, and fully approved of; it was resolved, a letter should be addressed to Government as proposed.

Proceedings of the Asiatic Society for the month of FEBRUARY, 1845.

The Monthly Meeting of the Society was held at the Rooms, on Tuesday evening, the 25th of February, at half-past seven P. M. S. G. T. Heatly, Esq., in the chair.

The following report was read by the Secretary, being that of the preliminary Meeting of the Committee of Papers for the despatch of business.

Secretary's Memorandum for the Meeting of 25th February, 1845.

An Oordoo novel, by Mr. J. Corcoran, written to exemplify the capacity and power of that elegant Vernacular language, and on which I was enabled to report favourably, philologically speaking, is recommended by the Committee of Papers to the patronage of the Society, by a subscription for fifteen copies, at four rupees twelve annas each. The Committee will examine further as to whether this work is worthy, on the whole, of being recommended as a school-book, for which its author intended it.

Resolved—That fifteen copies should be subscribed for, and the work further examined.

I have received and laid before the Committee a valuable suggestion by that eminent Oriental scholar, Dr. A. Sprenger, for the commencement of the publication of a Bibliotheca Asiatica, or a series of standard works in Eastern languages, edited and translated under the superintendence, and at the cost, of the Society. This useful undertaking, projected nearly forty years ago, is now revived; and as the Committee are in a position to assure the Society that they can command copious and valuable material for its commencement, they strongly recommend to the Society that the proposition be entertained, and that they be empowered to direct their attention to the subject, and report as early as they can what measure can be taken in furtherance of the undertaking.

Ordered—That the further report of the Committee be awaited, the Society acknowledging the expediency of the suggestion, and thanking Dr. Sprenger for it.

A letter from Government having been received, with copies of communications from Capt. Marshall, Secretary to the Sanscrit College, and a Mussulman printer by name Abdoolla, sometimes called Molvee Abdoolla, well known to the Society, respecting the printing of the *Musnuvee Roomee*, I have been instructed to submit a note on the subject to the Committee, as the opinion of the Society is requested by Government as to the proposed printing of the work which had already, as noted by me, been suggested to us. A detailed report will be made at our next Meeting.

Resolved.—That the report be received, and discussed at the next Meeting.

I am directed to state to the Society, that the Committee of Papers have recorded an opinion as to the hour of meeting of the Society, not in consonance with the note of the meeting before last. It was then decided, that the hour should be half-past Seven; the large majority of the Committee incline decidedly to the old hour of half-past Eight P. M. The opinion of these gentlemen necessarily carries so much weight with it, that the minority desire the question to be re-submitted for your consideration.

Resolved.—That the next Meeting be held at $\frac{1}{2}$ past 8, experimentally, and the question then be considered open for discussion.

A letter from Mr. Ince, Superintendent of Salt Chokees, on some of the salt springs in the Chittagong district, to my address, has been referred, with the thanks of the Committee, to our Geological Curator.

A set of lithographs of some of the Cave Temples of the Dukhan, by James Fergusson, Esq., presented by his brother, W. Fergusson, Esq., have been duly received, and the handsome donation richly merits your thanks.

A letter from Captain Crommelin, with note of despatch of Geological specimens from Darjeeling.

A letter from Mr. A. Campbell of Darjeeling, forwarding an interesting account of a new Thibetan antelope, with remarks on the Zoology of Thibet.

Reports from Government respecting the recent supposed Sub-marine Volcano on the coast of Arracan, in reply to our letter, suggesting enquiry on this subject.

Valuable geological notes across the Peninsula of India, by Capt. Newbold of the Madras Army, have been referred to the Geological Curator, and ultimately held available for our Journal.

Observations on the rate of evaporation in the open sea, with notice of an instrument used in indicating its amount, by J. W. Laidley, Esq.

A memorandum on the old bed of the river Soane and site of Palibothra, by S. C. Ravenshaw, Esq. C. S., has been received by me, and will be held available for the Journal, the thanks of the Society being due to its author.

For the above, the thanks of the Society were voted.

We have received a gratifying letter from the Honorable Secretary to the Royal University of Christiana, acknowledging the receipt of some of our contributions, advising us of the proximate despatch of various objects for our Museum, and couched in terms expressive of the satisfaction of that learned body at finding itself in that constant communication with us, which it will be not less to our credit than to our advantage to foster and encourage to the best of our ability.

I have also to submit the epitaph to be placed on the tomb of our lamented friend, Csomo De Korosi, as approved by the Committee.

H. J.

ALEXANDER CSOMA DE KOROSI,

A NATIVE OF HUNGARY,

WHO, TO FOLLOW OUT PHILOLOGICAL RESEARCHES,

RESORTED TO THE EAST,

AND AFTER YEARS PASSED UNDER

PRIVATIONS, SUCH AS HAVE BEEN SELDOM ENDURED,

AND PATIENT LABOUR IN THE CAUSE OF SCIENCE,

COMPILED

A DICTIONARY AND GRAMMAR OF THE THIBETAN LANGUAGE,

HIS BEST AND REAL MONUMENT.

ON HIS ROAD TO H'LASSA TO RESUME HIS LABOURS

HE DIED AT THIS PLACE

ON THE 11TH APRIL, 1842.

AGED 44 YEARS.

HIS FELLOW LABOURERS,

THE ASIATIC SOCIETY OF BENGAL,

INSCRIBE THIS TABLET TO HIS MEMORY.

REQUIESCAT IN PACE.

J. Weaver, Sculpt. Calcutta.

The slab with this inscription has been despatched to Darjeeling, to our fellow labourer and associate, Dr. Campbell, Superintendent at that station.

The two following letters from Mons. Eugene Burnouf, of the Asiatic Society of Paris, and from Count Scopoli, Secretary to the Academy of Verona, have received the attention they merit in due course; Mr. Heatly having charged himself with obtaining the eggs of the Phalena required by the latter Society.

H. TORRENS,
V. P. and Secy. As. Soc.

NOTE.—The following letter from Lieut.-Col. Ouseley, I publish at his desire, clearing up a mistake which would seem to have occurred respecting the survey of the Nerbudda river, published in a recent number of the Society's Journal. I need only add, that Lieut.-Col. Ouseley, has placed the remainder of the map at the disposal of the Society, and that it will be lithographed for speedy publication.

H. TORRENS,
V. P. and Secy. As. Soc.

MY DEAR SIR,—I observe in No. CLI. of the Journal, a map of the Nerbudda, forwarded with Mr. A. Shakespear's letter. I find that Mr. Shakespear has remarked in a note, page 497, "The original survey is not to be found on record, Capt. Ouseley appears only to have submitted the result of it with his opinions."

This is written without reference to the map itself, which is actually that done by me, (from the Devnaguree original) every word of which is written in my own hand, and certified by me in the map, which is reduced, as mentioned by the lithographer, to one-fourth.

As I had a great deal of trouble in making it, it gives me much pleasure to see it where it is. The survey, at considerable expense to the Government, was only sanctioned by Lord William Bentinck on my repeated representation.

I have the original sketch, and the only copy I made for the Government is that from which Mr. Smith reduced the one now presented to the public. I mean to have it lithographed over again, as the most valuable part is left out, and the eastern course of the river beyond Babye, that part on which the coal and iron mines are situated, which minerals will I trust be the means of creating the most surprising and beneficial changes in the country, in supplying material for a grand trunk rail line across India.

May I request the favor of your giving this letter a place in the next Journal.

I am, my dear Sir,

Yours very faithfully,

Calcutta, 22nd February, 1845.

J. R. OUSELEY.

To the Vice President and Secretary of the Asiatic Society of Bengal, at Calcutta.

SIR,—I have had the honor of receiving your letter, dated the 13th August, this year, and I think it my duty to lose no time in answering the same. It is about a fortnight since the Royal University of this town received two boxes of tinned iron, containing a collection of ornithological preparations and other objects of Natural History, some Indian coins, and a catalogue of books and manuscripts in the Indian languages, belonging to the Asiatic Society. We have also in July last, received a parcel with seeds, like another which arrived about a year ago. The Senatus Academicus has

resolved with respect to these different presents, to return its best thanks in a letter to the learned Society, and to accompany the same with a collection of different objects belonging to the Natural History of these northern countries, viz. zoological preparations, plants, minerals and seeds, as also with a collection of books, being a continuation of the works already sent. These things, the arrangement of which has been left to the care of the undersigned, are partly ready to be sent; what is still wanting will be collected during the next winter, and sent off with the first opportunity in March 1845.

The University at Christiania looks upon the existing scientific intercourse with the honored Society, as very interesting to both institutions, and will do any thing in its power to continue the same. The University Council, or *Senatus Academicus*, will also declare this in its above-mentioned letter, but I have thought it right to mention it in this preliminary notification. Books or any other things than the above-mentioned have not been received from your Society; as soon as any thing arrives, I shall have the pleasure of announcing it.

Sir Charles Tottie, the Norwegian, and Swedish Consul General at London, will forward any box or parcel for the University of Norway, directed to his care. Captain Bowneivie of the Norwegian Navy at Rungpore, to whom we are indebted for the existing intercourse between the two institutions, has also always shown the greatest willingness in forwarding scientific objects to this University. In conclusion I have also to state, that your letter, dated 20th May last, (which arrived at the end of last month,) has been communicated to all the professors whom it concerns.

Sir, your obedient servant,

C. HOLST,

Secretary of the Royal University at Christiania.

Christiania, the 24th October, 1844.

M. H. PIDDINGTON, Secrétaire adjoint de la Société Asiatique du Bengale.

Monsieur.—Le départ de Mr. Mohl, notre Secrétaire du Conseil m'a laissé le soin de vous remercier au nom de la Société de la peine que vous avez bien voulu prendre de nous informer de la mort si regrettable du savant Ramcomul Sen. Il sera bien regretté de la Société qui savait les services qu'il a rendus aux lettres et à la civilisation en général en composant son excellent dictionnaire Anglais et Bengali. C'est aussi pour nous une perte, parceque nous pourrions difficilement retrouver un correspondant aussi instruit et aussi zélé.

Mr. Mohl, à son prochain retour, doit s'entretenir avec vous de cet objet, et il vous rendra compte de la vente des Livres de votre Société que nous avons placés à Paris.

Excusez la forme un peu courte de cette lettre. Ignorant exactement le nom et les titres de Hurremohun Sen, que nous n'avons pu bien lire, j'ai cru pouvoir inclure la lettre que nous lui adressons dans ce court billet. Je vous serais bien reconnaissant d'y faire mettre son adresse exacte.

Votre bien dévoué serviteur,

24 October, 1844.

Eugl. BURNOUF.

A la Société Asiatique, Calcutta.

Les remarques faites par M. M. Helfer et Ugon sur les phalènes, dont aux Indes on tire la soie, ont excité l'attention de cette académie, et le plus vif désir d'avoir des oeufs de l'espèce *Cynthia*, puisqu'on cultive ici le Ricinus dont les feuilles nourrissent ses

vers producteurs, c'est vrai, d'un tissu soierie qui n'est pas fin, mais qui peut être utile a certaines manufactures. L'éducation ailleurs de ces vers se ferait dans notre province dans un tems presque tout à fait libre d'autres travaux agricoles. C'est pourtant à la Société Asiatique qu'on ose s'adresser pour avoir les nouveaux œufs, et on espère qu'elle accueillera cette prière avec le même intérêt, qu'elle donne aux progrès des sciences dans les vastes établissement Britanniques, en Asie, qu'elle nous fait connoître sous tous les rapports. L'amour du savoir, et le noble plaisir des répandre les connoissances utiles, rapprochent les plus grandes distances, et font une seule famille parmi ceux qui sont capables de viser à l'un et de goûter l'autre. Si jamais cette academie pouvait être honorée de quelque commission par un Société dont elle reconnait la supériorité, elle en serait non seulement reconnoissante mais orgueilleuse.

Le Secrétaire perpétuel,

Jéan Comte Scopoli ; Jadis Conseiller d'état,
et directeur général de l'instruction publique,
dans le Royaume d'Italie.

Veronne, le 10 Aout, 1838.

Read the following—

REPORT OF THE CURATOR, MUSEUM OF ECONOMIC GEOLOGY, AND GEOLOGICAL AND MINERALOGICAL DEPARTMENTS, FOR THE MONTH OF JANUARY, 1845.

Captain J. H. Low, B. N. I., has presented us with some fine specimens of lava and capillary obsidian, and some of sulphur from the volcano of Killauea* in the Island of Hawaii, and some volcanic specimens from Manilla: his letter is as follows:—

H. PIDDINGTON, Esq.

MY DEAR SIR,—I beg to present to the Asiatic Society the following specimens brought from the grand volcano of Killauea in the Island of Hawaii, four pieces of lava, six pieces of sulphur, and some capillary glass; also two *tapas* or native cloths, and a skull of some animal which I picked up at the spot where the bones of the celebrated navigator Capt. Cook were buried, being about one mile from the spot where he was killed. Should you wish for it, I can send you some specimens collected by me at the volcano, in the lake de Taal de Bonbon, in Luconia, about 50 miles from Manilla. It may be interesting, sending a small bit of the rock on which Cook fell at Korakarnah Bay, which I broke off. Had you not access to better information relating to the Sandwich Islands than I could give, I should be happy to give my mite.

No. 5, Garstin's Buildings, 16th January.

J. H. Low.

MY DEAR SIR,—I have the pleasure to send you some specimens from Manilla, or rather the large piece I picked up in an extinct crater, which is at present a small lake, close on the margin of the great lake in Luconia. The spot on which I picked up this specimen, is a lake evidently filled from the great lake; it occupies the sunken summit of the hill, densely clothed with timber, only one mile from the hot bath, which I found on keeping the Therm. for sometime in it to rise to 170° Faht.

The smaller specimens I collected at the volcano in the Island in the lake de Taal de Bonbon. The ignorance of the people in Manilla was such that they wanted to

* Killauea in MSS. No doubt Kirauea of Mr. Ellis and other travellers.—H. P.

persuade me the Island had been formed within fifty years, and was only of mud, I picked up these specimens. Although within 60 miles of Manilla, such is the information to be obtained there. I send you also a bonnet from the Sandwich Islands, such as worn by the native ladies there, and made by them.

J. H. Low.

The following Diary accompanies the specimens referred to in it, from the Hot Springs of Chittagong.

MY DEAR MR. TORRENS,—I will now endeavour to give you some account of my travels, but fear it will prove but an imperfect one. On the 9th of this month I reached Seetakoond, where I began my inquiries about the springs, and the next day visited the nearest. I left my tent a little after 11 A. M., and was soon obliged to leave my palkee behind. A walk of little more than half an hour over the bed of what must be an awful torrent during the rains, brought me to the spring; it is raised a little above the bed of a small nullah, which branches off from the torrent bed: the spring is about eight feet by six, and not more than a foot and a half deep; in three or four places the water rises in small bubbles: it is quite cold and beautifully clear; it is nearly double the strength of common sea-water. The great drawback is the difficulty of approach. The spring has no particular name, but is known by the Pergunnah in which it is situated—Pantaseelah; beyond it and in a continuation of the road I went, (if it can be so called) is the Doburrea or Dobie Kedallah or Pass, which goes direct through the hills and is said to have been cut by a Dobie. I struck off from the main road at a village called Yakoobnuggur. I believe, I am the first European who has ever visited this spring.

On the 11th I went on to near Jeygopal's *hauth*, and then left the main road, from which in about half an hour I reached the famous spring called Nabboo Luckee, the distance being about two miles, rather more. This road is generally good, but over the torrent bed, which is much the same as the other; the rush of water must however be greater in the rains, and during that season the people who attend at the spring are obliged to make use of a narrow foot path over the hills; it is situated on a rising ground of about 8 or 10 feet above the bed of the stream, a temple is erected over it, and I had to descend about half a dozen steps. The pukka part round the spring is about three feet square, and not more than three feet deep; on the right hand side is a small place raised about a foot and a half above the other parts, but communicating with the spring, and from the hole marked A, in my sketch, a flame issues, which is constantly fed with *ghee*; conceiving that there might be some tricking I made them put the light to the hole marked B, when a beautiful blue flame issued, such as would not have been caused by *ghee* alone; on the left hand is a spout, which goes through the temple wall into the spring, and through which is a constant flow of the water; within the spring is a sound resembling the *growl of a dog*, repeated about every second, when a large bubble rises to the surface, and bursts a few yards to the left; and a little above the bed of the torrent is another spring, called Duddee Koond, bubbling up in the same manner as the first I saw; the water of the three is of the same strength. On the 14th, I set off to visit Soorjoo Koond, but there was so much uncertainty about the distance and exact spot, that I was induced to try the strength of the water about half a mile from the main road, and found it about one-third less in strength than the other springs. I then went to the one considered by the natives as the *most holy*; it

is called Boolooa Koond. The greater part of the road is excellent, being cut from the side of the hills; the spot on which the spring is situated is considerably elevated above the plain, but the ascent is very gradual, the hills are thickly covered with jungle, amongst which appears the wild plantain. On arriving at the foot of the spring, I had to mount some twenty steps; at the top were several temples, the principal one covering the spring, which they told me was fathomless. A small place is raised at the side, the same as at Nubboo Luckee, from which issues a flame well fed with ghee; through the lower hole opening from the surface of the spring, a flame is constantly coming out and running a short distance on the water, but goes out again immediately. I have no doubt the ghee has something to do with it; the water is fresh with a slight sulphurous smell and taste; but to enable you to form a better idea of it than I can give, I send by my friend Major Troup, two small boxes to your address, one containing three bottles of water from the Nubboo Luckee and Boolooa Koond, and one taken up about half a mile from the main road, and which is said to come from Soorjoo Koond, and other springs, both salt and sweet; but I was afraid to remain out any longer, lest I might lose my travelling allowance, and I could not afford that. The other box contains large and small pebbles, a kind of unformed slate, and some gravelly earth taken from the bed of the torrent, and a small piece of coal which I picked up on the edge of the stream running from the Soorjoo Koond; a small bottle of Kurkutch from the Soorjoo Koond water, and some salt which I can hardly venture to call *pangah*, it was from the Nubboo Luckee water filtered through some salt earth I brought from the spring; I must leave you to decide what it is.

ROBERT INCE.

P. S. I find that I have expended all the Soorjoo Koond water, so that you will find only two quart bottles. The whole of these places are, I conceive, of *volcanic* origin, for small flames are to be seen in many places, issuing from the ground. I regret much now that I could not visit any of them, but hope to do so when I again go in that direction.

Through Captain Duncan, B. E., we have received from Lieut. T. C. Blagrave of that corps, now in Scinde, two boxes containing fossils (mostly shells,) and one containing fish preserved in salt, together with a large fossil shell from Reree, by Captain W. E. Baker, Engineers.

These fossils are of very great interest, and in connection with the geological specimens promised us by Captain Baker, will no doubt throw light on the geology of that new country; but we have as yet no note of the localities in which the fossils and shells were collected.

We received from Captain Williams, our active correspondent at Kyook Phyoo, the following letters, giving an account of a remarkable appearance seen at sea from that and other of the Arracan stations.

H. PIDDINGTON, Esq., *Sub-Secretary, Asiatic Society of Bengal.*

MY DEAR SIR,—Yesterday evening, at between 5 and 6 o'clock, as we were taking our ride, we were alarmed by an extraordinary appearance far out at sea, as if a vessel was on fire: the reflection of the flame was made on a dark bank of clouds, west of the station, on the track of ships from hence to Calcutta: it flickered several times as if

the fire had been got under, and after lasting about 15 or 20 minutes (say,) suddenly went out. Various are the conjectures: I thought it was the reflection of the sun from below the horizon, but the sudden light of flame was too brilliant, and unsteady to be the sun's light; electricity in the cloud was stated to be the cause, but this is not a season for such cause: "a ship is on fire," many said; but this morning the prevailing opinion is, that a volcanic eruption has taken place 20 miles out at sea, similar to what I reported as having taken place near Chedooba. The argument against its having been a ship on fire is, that the flame shewing so brilliant and so great a light could not be so suddenly extinguished as this was, the dark bank of clouds may have been formed of the smoke of the volcano. I hope some further information than what is obtained from mere conjecture will be gained, which I will not fail to communicate to you. The Amherst is said to have left, or was to leave Calcutta yesterday, so she cannot be far enough out to see it.

D. WILLIAMS.

P. S.—A small comet was also seen at the same time as the fire, which soon set; it was situated a little south of the supposed volcanic eruption.

We shall see the comet of course this evening, and I will write by next date.

D. W.

Kyook Phyoo, 3rd January, 1845.

MY DEAR SIR,—As I was at a distance from the beach when the fire appeared last evening, Ensign Hankin of the 66th N. I. has most kindly given me a description of what he saw and heard, and I have the pleasure to enclose it, to be laid before the Society.

Kyook Phyoo, 3rd January, 1845.

D. WILLIAMS.

Major WILLIAMS, Kyook Phyoo.

MY DEAR WILLIAMS,—I have complied with your request for a description of the extraordinary phenomenon witnessed here last night, but I am afraid in a very imperfect manner.

G. HANKIN.

On the night of the 2nd of January 1845, between the hours of 6 and 7, a very interesting and singular phenomenon was observed off the coast of Kyook Phyoo. The sky on the horizon was observed to brighten up as when illumined by the rays of the setting sun, excepting that the light more resembled the flickering of a fire than the gradual descent of that luminary. It continued in this way for half an hour or so, when all of a sudden immense volumes of flame were seen to issue, as it were from the depths of the ocean, presenting the most sublime yet awful spectacle to the beholders. The general idea entertained, was, that a ship had caught fire; but this was soon dispelled by a low continuous rumbling, which seemed to sound from the bowels of the earth, and was re-echoed by the surrounding hills. Previous to this, however, Capt. Howe, the marine superintendent, had with the greatest promptitude set off in H. C.

Schooner "Petrel," intending to render assistance to the supposed unfortunates of the burning ship; he returned without seeing any thing, and it is thought that the whole was the result of some hidden volcanic agency; one of the neighbouring hills possessing that extraordinary property, and from which flames have been seen to issue before. The weather at the time was still and serene, hardly a breath disturbed the air: it was in fact, as some one observed, a very earthquakey day.

Kyouk Phyoo, 3rd January, 1845.

I wrote immediately to Captain Paterson of the H. C. S. Amherst, then in the river, to enquire if he had any knowledge of this phenomenon, and his answer is as follows:—

MY DEAR MR. PIDDINGTON,—The appearance of the eruption of a volcano took place some days before we reached Arracan. I heard of it from several parties when I got there. The bearings were taken by the following gentlemen: by Capt. Howe at Kyouk Phyoo, by Capt. Siddons at Akyab, and by Capt. Watson, commanding the Govt. Schooner "Spy," off St. Martin's Isle to the North. As I did not receive a very correct account, but understood that it was *officially* sent up, I did not trouble myself further than to enquire in what direction it took place. From all I can now remember, by the bearings, it was about fifteen miles to the South of the "Western Balongo," near which is a Shoal patch of Coral; the least water I ever found was eleven fathoms. Lloyd and Ross in the Chart lay down seven fathoms. It seems to have alarmed some of the people at Kyouk Phyoo, but if you require further information, the whole of the officers of the 66th N. Infantry that saw it are encamped on the plain below the Fort.

J. PATERSON.

As it was important that time should not be lost, the following letter was addressed to Government, under the direction of our Secretary.

F. HALLIDAY, Esq., *Secy. to Govt. of Bengal.*

SIR,—By direction of the Committee of Papers of the Asiatic Society, I have the honor to submit the accompanying extracts of letters from Captain Williams, 1st Assistant to the Commissioner of Arracan, and from Ensign Hankin, giving details of a curious phenomenon seen at sea; which, by these accounts, and those collected by Captain Paterson, H. C. S. Amherst, were probably occasioned by the eruption of a sub-marine volcano.

As this may also have given rise to a new Island or a shoal, as was the case off False Island in August 1843, where a new Island appeared, but sunk shortly afterwards, the Committee respectfully suggest that orders might be given to Captain Paterson, on the approaching voyage of the Amherst, to examine the spot; as in a mere hydrographical point of view, as well as the geological interest of such phenomena, the knowledge, even of any alteration of the soundings, must be of much public interest.

H. TORRENS,

Vice President and Secretary, Asiatic Society.

In reply to which we have received the following with an official report.

(No. 450.)

From the Under Secretary to the Government of Bengal, to the Vice President and Secretary, Asiatic Society, dated Fort William, 12th February, 1845.

Marine.

SIR,—I am directed to acknowledge the receipt of your letter, without date, submitting extracts from letters, regarding the eruption of a sub-marine Volcano, seen from Kyouk Phyoo, and conveying the suggestion of the Committee of Papers of the Asiatic Society, that Captain Paterson, on the approaching voyage of the "Amherst" to that station, may be instructed to examine the spot with a view of ascertaining the effects that may have been thereby produced.

2. The Acting Superintendent of Marine having also forwarded a correspondence referring to the Volcanic eruption in question, I am directed, in reply, to forward copies of these documents; from which it will be observed that, under the orders of the Commissioner of Arracan, all that is necessary has been done, but that no ascertained effect has been produced by the eruption, and that the soundings on the Arracan Coast continue as heretofore.

CECIL BEADON,

Under Secretary to the Government of Bengal.

(No. 366.)

From Lieut.-Colonel A. IRVINE, C. B., Acting Superintendent of Marine, to the Right Honorable Sir HENRY HARDINGE, G. C. B. Governor of Bengal, dated Fort William, the 24th January, 1845.

RIGHT HON'BLE SIR,—I have the honor to submit, for your honor's information, the

Copy of a Letter, No. 8, correspondence noted in the margin, referring to a grand Volcanic eruption, seen from Kyouk Phyoo, dated the 14th January, 1845, from the Commissioner of Arracan, with enclosure.

2nd. No ascertained effect has been produced by this Volcanic eruption, and the soundings on the Arracan Coast remain as before; but the occurrence seems sufficiently interesting to be reported, and if it meets with your honor's approval, I would forward copies of the correspondence to the Asiatic Society for record.

*Fort William, Mar. Supdt.'s Office,
the 24th January, 1845.*

(Signed) A. IRVINE,
Acting Supt. of Marine.

(No. 8.)

From Capt. A. BOGLE, Commissioner in Arracan, to Lieut.-Col. A. IRVINE, C. B. Superintendent of Marine, Fort William, dated Kyouk Phyoo, the 14th January, 1845.

SIR,—A very grand Volcanic eruption having been observed N. N. W. of Kyouk Phyoo, a little after sun-set on the evening of the 2nd instant, I directed Mr. Howe, Marine Assistant, to proceed to the supposed spot for the purpose of ascertaining whether any rocks had been thrown up or any change had taken place in the soundings; I have the honor to annex copy of his report, by which it appears that he has not been able to discover any alteration whatever.

2nd. I also annex extract from a report from Mr. H. B. Weston, commanding the "Spy," who saw the eruption off the Asseerghur Shoal; it was also seen from Akyab, and I would observe that the bearing taken by Mr. Weston at sea, by Mr. Howe at Kyouk Phyoo, and by the officers at Akyab, place it in $19^{\circ} 42' 15''$ N. latitude, and $93^{\circ} 4' 45''$ E. longitude, bearing S. $\frac{3}{4}$ E. from S. end of Western Borongo.

3rd. On Mr. Weston's way down to this post, he sounded carefully for indications of the Volcano, but without effect; and since he arrived, the "Tenasserim" steamer with the "Amherst" in tow, must have passed near to it, without observing any change in the soundings.

4th. Mr. Weston will, however, be directed to make further search in the course of his cruising.

5th. I may add, that a small comet made its appearance in the S. W. on the same evening that the eruption occurred, and has been visible every night since.

Arracan, Comm.'s Office, (Signed) A. BOGLE,
Kyouk Phyoo, the 14th January, 1845. *Commissioner in Arracan.*

(True copy.)

(Signed) JAMES SUTHERLAND, *Secretary.*
Fort William, Mar. Supdt.'s Office, the 24th January, 1845.

(No. 4.)

From H. HOWE, Marine Assistant Commissioner, to Major A. BOGLE, Commissioner of Arracan, dated Kyouk Phyoo, the 8th January, 1845.

SIR,—I have the honor to inform you, that according to your directions, I proceeded on the 6th instant in search of any effects that might be visible of the Volcanic eruption on the 2nd instant.

Having observed the eruption, and the spot where the flames appeared to rise up out of the water, I set it by compass at W. N. W. from the Flag Staff, and reckoning

the distance from the place of observation to be about 16 to 18 miles, that would place any rock or shoal that might have been thrown up, or any discoloured water, about 5 to 8 miles to the north of the northern breakers off the Terribles.

I accordingly proceeded to this spot and cruised about, carefully sounding and keeping a good look-out from the mast-head in a circle, from Lat. $19^{\circ} 27'$ to $19^{\circ} 36'$, Long. $93^{\circ} 16'$ to $93^{\circ} 25'$ E.

Not the smallest appearance of an eruption having taken place was observed in this direction, nor the slightest trace of its effects; the soundings were all regular as laid down on the charts; and having before had the coast, from the extreme point of my observations up to northward, carefully surveyed, though out of the line of bearing, I have returned in with the conclusion that no rock or shoal has been cast up by the late action of the Volcano, nor have the soundings been at all affected, nor the channel disturbed.

From this up to the northward and westward, the ground has been repeatedly passed over by salt brigs and vessels belonging to the Flotilla, by none of which has any thing extraordinary been observed.

M. A. C.'s Office, Kyouk Phyo,
the 8th January, 1845.

(Signed) H. HOWE,
Mar. Asst. Commissioner.

Extract from a letter from Mr. H. B. Weston, Commanding the Hon'ble Company's schooner "Spy," dated 11th January 1845, No. 4.

"At 6 P. M. on the 2nd instant, I observed a large fire S. E. by S. (being then off the Asseerghur Shoal), from which was thrown up five different times large masses of fire. I supposed it to be a volcanic eruption, and in coming down the coast sounded to see if any alteration had taken place, but found none; I went into Akyab, and having got a bearing from there, proceeded in the direction, sounding, but have no alteration more than a fathom, and that in steep places.

"I also kept a look-out for burnt wood in case it might have been a vessel burnt, but found none: I have enquired of the vessels boarded, and they give a similar description of it; a Chinese Junk excepted, who stated it to be a ship on fire, but had seen no traces of her, though he went in the direction."

(True copy and extract,)

Fort William, Mar. Supdt.'s Office,
the 24th January, 1845.

(Signed) A. BOGLE,
Commissioner of Arracan.

(True copy,)

(Signed) JAS. SUTHERLAND, *Secy.*
(True copies,)

CECIL BEADON,

Under Secy. to the Govt. of Bengal.

It would appear from the foregoing, that there can be no doubt of the phenomenon, and extremely little probability of its having been a vessel on fire. As connected with the former eruptions in that quarter, all these notices are of the greatest interest, and we are fortunate in possessing there in the persons of Captain Williams and his friends, such zealous observers and reporters.

We have also received from Captain Newbold, M. N. I., a valuable paper on the Geology of Southern India, which, as soon as the diagrams can be lithographed, will I

hope adorn our Journal; Captain Newbold promises a continuation of his paper, and from his zeal, opportunities and talents, we may expect all which they can accomplish under the disadvantage, common to all scientific votaries in India, of being sadly circumscribed as to time. From Mr. Ince of the Salt Department, we have received through Mr. Torrens, bottles of water, and a box of rocks and pebbles from the salt springs in the Chittagong district, with a letter giving an account of his visit to them. I have not yet examined them, as they arrived very late.

Lieut. Baird Smith has just forwarded Part III. of his valuable papers on Indian Earthquakes, which will also be no doubt forthwith published.

Lieut. Sherwill has referred to us a small box of specimens of limestones from the
Museum of table-land of Rhotasghur, requesting me to select those
Economic Geology. most likely to prove useful as lithographic stones. From
minute fragments it is next to impossible to judge; but I have returned them to him,
with the most likely specimens separated from those decidedly bad; and, as he pro-
mises us slabs, we shall then be enabled to give them a fair trial.

Proceedings of the Asiatic Society of Bengal, MARCH, 1845.

The monthly meeting was held at the Society's Room, on Tuesday, the 18th March, at $\frac{1}{2}$ past 8 P. M.

Charles Huffnagle, Esq. in the chair.

The following list of books presented and purchased was read :—

Books received for the Meeting of the Asiatic Society, Tuesday, March 18th, 1845.

BOOKS PRESENTED.

1. Meteorological Register kept at the Surveyor General's Office, Calcutta, for the months of December, 1844, and January, 1845.

2. Jahrbücher Der Literatur, of 1843, vols. 4.—By the Baron Von Hammer Purgstall.

3. Geschichte Der Ilchane, by the Baron Von Hammer Purgstall, vol. 2.—By the Author.

4. The Sugar Planter's Companion, by L. Wray, Esq. Part II.—By the Author.

5. Proceedings of the Academy of Natural Sciences of Philadelphia, vols. 2, Nos. 2 and 3.—By the Academy.

6. The Oriental Christian Spectator, for the months of January and February, 1845, Nos. 1 and 2.—By the Editor.

7. The Calcutta Christian Observer, for the months of February and March, 1845.—By the Editors.

8. Journal of the Agricultural and Horticultural Society of India, Part IV.—By the Society.

9. The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, No. 165, September, 1844.—By the Editor.

10. Proceedings of the Geological Society of London, vol. 4, No. 98.—By the Society,

11. The Journal of the Royal Geographical Society of London, vol. 14, Part I. 1844.—By the Society,

12. Proceedings of the Royal Society, No. 59; 1843-44.—By the Society.

13. Philosophical Transactions of the Royal Society of London for the year 1844, Part II.—By the Society.

14. Recherches Sur les Poissons Fossiles, par Lt. Agassiz, Quatorzième, Quinzième et Sizième livraisons réunies, 1842 and 1843.—By the Editor.

15. Ditto Ditto, Planches Quatorzième, Quinzième, et Seizièmes livraisons réunies. 1841 and 1843.—By the Author.

16. Specimens of the illustrations of the Rock-cut Temples of India.—By J. Ferguson, through W. Ferguson, Esq.

17. Five Maps of different parts of Asia, Berlin, Beimer.—By the Rev J. Hæberlin.

BOOKS EXCHANGED.

18. Calcutta Journal of Natural History, January, 1845, No. 2.—By John M'Clelland.
19. The Annals and Magazine of Natural History, including Zoology, Botany and Geology, Nos. 92, 93, 94 and 95 of November, 1844, to January, 1845, vols. 14 and 15.
20. Journal Asiatique. Quatrième Serie. Nos. 14 et 15, Mai et Juin 1844. Tome III.
21. Journal des Savants, Juillet, 1844.
22. The Athenæum for November 9 and 16,—December 7, 14, 21 and 28, 1844, and January, 1845, 4-11, and 18.

BOOKS PURCHASED.

23. History of the Indian Archipelago.—By J. Crawford.
24. Strange's Elements of Hindu Law, vol. 2.
25. The Classical Museum, No. VI., January, 1845.

Mr. C. Joseph presented a copy of his map of the river Hooghly, from Garden Reach to Bandel.

Read the following letter from Messrs. Allen and Co., the Society's London Agents.

HENRY TORRENS, Esq. *Secretary to the Asiatic Society of Bengal.*

SIR,—We beg to state you, for the information of the Society, that we have every reason to expect the completion of the bust of Mr. Hodgson in the course of six weeks or two months from the present date.

We have, as requested in your letter of the 30th May last, applied to the Proprietors of the Athenæum and Spectator respecting the non-receipt of their publications by the Society since December, 1840. We have not been favoured with a reply from either party, and conclude it is not their desire to make an exchange of publications with your Society. It is not quite usual for the Proprietors of Newspapers to furnish gratuitously their publications. They expect to receive and very seldom make any return.

The Journal of the Royal Institution has not been published for years. In our next parcel to the Society, we shall include the Asiatic Journal from January, 1841, to the present time, and it shall be continued as published in future. Your favor of the 5th October last, acknowledging the receipt of our account sales, and giving us instructions as to the disposal of the balance, shall have our best attention.

We have the honour to be, Sir, your faithful Servants,

London, January 12th, 1845.

W. H. ALLEN AND CO.

Read correspondence, with notes by the Secretary and Committee of Papers, from Mr. J. Hendrie, soliciting employment as draftsman to the Society, and claiming payment of a bill to the amount of Co.'s Rs. 250, which had been submitted by him for work done on trial.

Resolved that the recommendation of the Committee of Papers, that Mr. Hendrie be paid the sum of Co.'s Rs. 150 for the works submitted, be adopted, and that the Committee of Papers be requested to report further as to the expediency of the employment of Mr. Hendrie.

Read the following note by the Secretary :—

At the December meeting Dr. Hæberlin announced through the Secretary his intention of publishing a Sanscrit Anthology consisting of fifty brief but choice specimens of the best School, that of Kali Dasa, of Sanscrit poetry, didactic, elegiac and others. This offers to the Sanscrit Scholar a description of work as yet a desideratum in the learned world, a book namely, which may enable him to study in brief, and at small cost, the best and choicest classical style of eminent writers in that ancient and admirable language. Dr. Hæberlin proposes to publish the work himself, but in communication with him the Secretary suggested to the Society their taking a certain number of copies of it. It will prove a most valuable book to the Society, for the purpose of distribution to learned bodies, and individual scholars in correspondence with it. The copies will be delivered at trade price. He stated that he was not prepared to note at present the number of copies to be taken, but after making a list of quarters in which they might be distributed, and a reasonable stock of reserve copies, the Secretary said he would have the honor of laying that list definitely numeralised, before the Society if the general proposition be favourably received.

The Secretary stated that it had been deemed advisable that the Society should subscribe for 100 copies of this interesting work, which was agreed to.

The Secretary presented on the part of S. G. T. Heatly, Esq. an abstract of the proceedings of the former Statistical Committee of the Society, (December, 1836, to March, 1839,) and it was resolved—

That the records which are not at present forthcoming be searched for, that the abstract be circulated to the Committee of Papers, that the Committee of Papers resume the Statistical Committee's deferred privileges, and that it be recommended to them to re-agitate the right of free postage, &c. &c.

The Secretary stated that he had received from Captain Cunningham and Mr. Tregear a collection of coins which they offered for sale, and of which the package, yet unopened, was upon the table, but that he desired, previous to submitting the proposal to the Society, to communicate with Captain Cunningham.

The following coins were presented by the Sub-Secretary on the part of Captain Marriot, B. N. I.—2 coins of Mahmed Shah, Ben Nassir Shah, A. H. 627-634. 1 coin of Mahmed Toghluk, A. H. 725-752, both were in the Society's cabinet, and 2 Bactrian coins of Kadphises, and on the part of Lieutenant Sherwill, B. N. I., of the Behar Revenue Survey, two bags containing 134 old pice of various coinages.

Read the following letter in reply to the Society's application for Lieutenant Yule's report on the Cherra Poonjee coal, as noted in the Proceedings for October last :—

To H. TORRENS, Esq. *Vice President and Secretary, Asiatic Society.*

SIR,—Under Orders from Government, communicated in Secretary Lieutenant Colonel Stuart's letter No. 120, dated the 6th December last, I am directed by the Military Board to forward copy of Lieutenant Yule's report on the coal formations of Cherra Poonjee with Sections, &c.

J. GREEN,
Secretary.

Fort William, Military Board Office, 4th March, 1845.

The Sub-Secretary stated that in relation to this valuable paper he would read the following extract from a letter of Lieutenant Yule's to his address of 22nd October last.

MY DEAR SIR,—The Sections and Report with the Military Board will be found quite useless for publication; they were the work of a young officer without any experience, just arrived in the country, and are almost confined to the account of different modes of conveying the coal to the plains. There is one point in them, which, however, should have met with attention, the coal which is found abundantly thrown up by the Panateet river near Landour. From want of time, the lateness of the season, and being unable to procure jungle cutters I was unable to trace it to its bed, and was ordered off before I could return, but the coal is apparently first rate, and probably abundant. The river is the same that I have described in the last paragraph of the notes last sent.

Kurnaul, October 22d, 1844.

The paper and plans, which last were much admired, were handed to the Editors of the Journal:—

Read the following letter to the Society:—

Monsieur TORRENS, Secrétaire de la Société Asiatique à Calcutta.

MONSIEUR,—Madame de Storr a l'intention de publier, a la fin de chaque mois une livraison de quatre costumes lithographiés and coloriés, des différent peuples que l'on rencontre à Calcutta; Je desire beaucoup, en regard de chaque costume, faire paraître une notice indicative des mœurs et habitudes de celui qui le porte. Mais étant depuis trop peu de tems dans le pays, je n'ai pas acquis assez de connaissances pour decrire avec vérité des coutumes dont je n'ai entendu parler que vaguement.

La Société Asiatique possède entre autres sur l'Inde, un ouvrage en 4 volumes intitulé *Les Indous ou description des Mœurs et ceremonies*, &c. et un autre en deux volumes ayant pour titre *l'Inde Française*.

Je pourrais dans les deux ouvrages trouver des renseignemens propres a completer celle que je me propose de publier; et en vous priant, Monsieur, de vouloir bien en faire pour moi la demande au conseil, j'ose vous assurer qu'ils seront soignés comme choses extrêmement precieuses et que j'aurais a cur de justifier la confiance qu'il aura bien voulu m'accorder.

Je vous devrai aussi des remerciemens que je vous prie d'accueillir, ainsi que l'assurance de la tres haute consideration de

Votre tres humble et obeissant Serveur,

Calcutta, 21st Feb. 1845.

A. B. DE STORR.

The Secretary stated that he had allowed M. De Storr to have from the library one volume at a time of each of the works applied for, as he deemed it incumbent on the Society to give every aid in its power to works of the kind proposed.

Read a note from E. B. Ryan, Esq. presenting to the Society a box of models of Ceylon boats, which were greatly admired for their beauty and fidelity.

The Secretary presented on the part of E. C. Ravenshaw, Esq. a memoir "On the ancient bed of the River Soane, and the scite of Pali-bothra" with a map. This valuable paper was handed to the Editors of the Journal for early publication.

Read the following letter from Major R. Leech, B. N. I.

To the Secretary to the Asiatic Society, Calcutta.

MY DEAR SIR,—I shall be glad to hear whether the Society feel an interest in the subject of this letter.

I have taken advantage of my having been last year in charge of the Keythul and Umbalah districts to have compiled a map of the *Kurukhetra*, the scene of the Mahá-bhárata, as well as an accompanying account to illustrate the map from that work, from another called the *Kurukhetra Mahatma*, and from existing legends collected at each spot from the eldest and most intelligent inhabitants.

I should be glad to know what aid the Society is disposed to afford me in publishing both, or the map alone, which is on a scale of two miles to the inch.

R. LEECH, 1st Ast. G. G. A. N. W. F.

Umbalah, New Frontier, 14th February, 1845.

The Secretary stated that he had written to Major Leech to say that the Society would be most happy to publish the work in question for him in its Journal or Transactions, being a subject of the highest Indian Classical interest.

Read the following extract from a letter by Lieutenant Baird Smith, to the Sub-Secretary :

I intend shortly sending you a few coins obtained from the old village or town discovered on the Muskurra River. These have been obtained without charge to the Society. The site of the town has hitherto been covered with large quantities of boulders for the use of the canal work, so I have not been able as yet to make any farther search, but as these are now, or soon will be cleared away, I hope to pick up something more.

Read a letter from G. Buist, Esq. in charge of the Bombay Observatory, intimating that he had dispatched on the ship *Sterlingshire*, a set of the Observatory Records for 1843, to replace those formerly sent which had been damaged by oil in the *dawk bangy* transit.

MUSEUM ECONOMIC GEOLOGY.

REPORT OF THE CURATOR OF THE MINERALOGICAL AND GEOLOGICAL DEPARTMENT,
FOR THE MONTH OF FEBRUARY.*Mineralogical and Geological.*

We have received from Major Crommelin, B. E., residing at Darjeeling, a small collection of 24 specimens of the rocks found by him on a tour in the neighbourhood of that station; he says:—

“The specimens are not so large as might be desired; the reason is that I proceed generally alone on my excursions, and find it no small addition to the fatigue of ascending 5000 or 6000 feet, to carrying a pocket load of stones.

Darjeeling, January 21st, 1845.

From Captain Munro, Her Majesty's 39th Regt. we have received two very pretty specimens of Ribbon Jasper from the neighbourhood of Gwalior, and a specimen of Limestone with fossil remains (shells) from the Hungrung pass in the Himalaya, at 16,000 feet.

Amongst the catalogues of collections which I have sedulously collected from every corner since my connection with the Museum, I found one, at least three years ago, of a collection of specimens by Dr. Jameson from the hills; but the specimens were no where to be found. I wrote to him on the subject, as also, through Mr. Torrens to Mr. George Clark at Umballah, but the collection appeared to be lost. To our great surprise it has re-appeared as will be seen by the following letters:—

To H. TORRENS, Esq. *Secretary, Asiatic Society, Calcutta.*

SIR,—When examining some wrecked property in my godown, the enclosed letter to your address was found, together with a quantity of stones, which I beg leave to forward to you.

Calcutta, 26th February, 1845.

J. HOLMES,
*Secretary, Union Insurance**

H. TORRENS, Esq. *Secretary, Asiatic Society.*

DEAR SIR,—As Mr. Clarke was sending some boxes to you, I have taken the opportunity of transmitting a few Geological specimens, collected during my tours in the hills, and which I beg you will have the goodness to lay before the Society, as they are intended to illustrate what I have written in your journal.

Umballah, 4th October, 1844.

WM. JAMESON.

The stones also have so far escaped injury that we have the full number of specimens. But the numbers, and consequently references, to about two thirds of them have been lost, being on paper labels only.* Dr. Jameson, however, can easily renew them from his Catalogue which is descriptive and I have written to him to request the favour of his doing so for us.

From our indefatigable contributor Captain J. T. Newbold, M. N. I. we have to announce another curious and valuable paper “On the Alpine glacier, Iceberg

* All specimens should be ink (and if possible paint) marked, with a number in India where damp or insects destroy paper forthwith, and a duplicate copy of the catalogue should be made at the earliest possible moment.

Dilmiat and were transition theories with reference to the deposits of Southern India, its furrowed and striated rocks and rock basins," which to form a valuable addition to our knowledge on these heads, touching which so little is yet known out of Europe.

In consequence of our application to Government, at the suggestion of Colonel Forbes for copies of Lieutenant Yule's memoir and plans relative to the carriage of coal in the Kassia Hills, copies of them have been sent to us from the Military Board and will be valuable as records in this department.

For all the foregoing communications and presentations the best thanks of the Society were accorded.



Proceedings of the Asiatic Society of Bengal, MAY, 1845.

The monthly meeting of the Society was held on Tuesday evening, the 13th May.

Charles Huffnagle, Esq. senior member of the Committee of Papers, in the chair.

At the commencement of the meeting Mr. Houston, C. S. begged to bring to notice what appeared to him to be an error in the proceedings for October, in relation to the picture voted to Mr. Bird. A conversation of some length arose out of this without the result of a vote. It was proposed by Captain Shortrede, and seconded by Captain Marshall,

“That no report of the Proceedings of the Society at its meetings be published till it has been verified by the next subsequent meeting,”—which was carried unanimously.

New Members Proposed.

Lieutenant Sherwill, 66th N. I., Behar Revenue Survey,—proposed by E. C. Ravenshaw, Esq. C. S. seconded by W. H. Quinton, Esq.

Dr. Henry,—proposed by E. Blyth, Esq. seconded by S. G. F. Heatly, Esq.

The following list of books presented, exchanged and purchased was read :—

Books received for the Meeting of the Asiatic Society, Tuesday, 13th March, 1845.

BOOKS PRESENTED.

1. Meteorological Register for February and March, 1845.—From the Surveyor General's Office.
2. The Oriental Christian Spectator, Nos. 3 and 4, of March and April of 1845.—By the Editor.
3. The Calcutta Christian Observer, of May, 1845.—By the Editors.
4. The Journal of the Royal Asiatic Society, No. XV. Part 2, 1844.
5. Notes on Indian Agriculture.—By A. Gibson, Esq.
6. On the Geographical Limits, History, and Chronology of the Chera Kingdom of Ancient India.—By J. Dowson, pamphlet, 2 copies.
7. Proceedings of the Zoological Society for 1843, Part II, two copies, and Proceedings from January to March, 1844, one copy.—By the Society.

8. Reports of the Council and Auditors of the Zoological Society of London, 1844, two copies.—By the Society.
9. Transactions of the Zoological Society of London, Vol. 3, Parts 2 and 3, London, 1843.
10. Magnetic Reports of the Observatory at Bombay, May to December, 1843.—By Government.
11. Magnetic Observations for 1842 and 1843, by G. Buist.—Presented by ditto.
12. Report on the Meteorological Observations made at Colaba, Bombay, from the 1st September to 31st December, 1842, by G. Buist.—Presented by ditto.
13. Meteorological Observations for 1843, by G. Buist.—Presented by ditto.
14. Tracings of the Wind-Guage for 1842, 1843, by G. Buist.—Presented by ditto.
15. Barometrical Observations, by G. Buist.—Presented by ditto.
16. Verhandeligen van het Bataviaasch genootschap van Kunsten en Wetenschap pen. Vols. 18, 19, 1842, 1843.—By the Society.
17. Natur en Geneeskundig archief voor Neerland's indie—Eerste Jaargang Batavia. 1844.—By ditto.
18. Catalogus Plantarum in Horto Botanico Bogoriensi cultarum alter auctore, J. C. Hasskarl, Bataviae, 1844.

Books Exchanged.

19. The Annals and Magazine of Natural History, Nos. 96 and 97, Vol. 15, February and March, 1845.
20. The Edinburgh New Philosophical Journal by Jameson, No. 74, July to October, 1844.
21. The London, Edinburgh, and Dublin Philosophical Magazine, third series, Vol. 25, Nos. 166, 167, 168, 169, of October, November and December, 1844.
22. Journal Asiatique, Quatrième Série, Nos. 16 and 17, Juillet et Août 1844.
23. The Athenæum, Nos. 900 to 907.

Books Purchased.

24. Introductory Lectures on Modern History, delivered in 1841, by T. Arnold, second edition, London, 1843.
25. Theogony of the Hindoos, by Count M. Bjornstjerna, London, 1844.
26. Political Philosophy, by H. Brougham, London, 1843 and 1844, 3 vols.
27. System of Logic, by J. S. Mill, London, 1843, 2 vols.
28. Journal des Savans, Septembre and Octobre, 1844.

Read the following letters, from Messrs. Allen and Co. the Society's London Agents, and W. W. Bird, Esq. :—

TO HENRY TORRENS, Esq. *Secretary to the Asiatic Society, Calcutta.*

SIR,—We have been requested by W. W. Bird, Esq. to forward you the enclosed letter. We beg to acquaint you that the map referred to by Mr. Bird was forwarded on the 26th February last by the ship Princess Royal from Liverpool, and will be handed over to the Asiatic Society by our agents as soon as it reaches Calcutta.

W. H. ALLEN and Co.

London, March 19, 1845.

TO HENRY TORRENS Esq. *Secretary to the Asiatic Society, Calcutta.*

SIR,—With reference to the intimation made by me to the Meeting held on the 5th of July, 1843, I have directed to be transmitted to you the newly constructed Map of

India by Messrs. W. H. Allen and Co. from surveys executed under the orders of the Hon'ble East India Company, which Map is the most complete at present procurable, and to request that you will have the goodness to present it to the Society on my behalf.

I have the honor to be, Sir,

Your obedt. Servant,

W. W. BIRD.

London, February 18, 1845.

Read the following letter from Mr. H. B. König at Bonn :—

To H. PIDDINGTON, Esq. *Sub-Secretary of the Asiatic Society, Bengal.*

SIR,—I have the honour to inform you that I have duly received, through the agents of the Asiatic Society, Messrs. Allen and Co., the books directed to me, and offer now my best thanks for this valuable communication.

Messrs. Allen and Co. will direct to you the following of my publications :

- 6 Script. Arabum
- 12 Radices Ling. Pracritiana
- 12 Panini, eight books
- 3 Malawica, Agnimitre
- 12 Radices Ling. Sanscrita
- 12 Meghaduta
- 12 Sacuntala
- 3 Lassen's Zeitschrift, part IV. V. VI. 16
- 6 Lassen's Indien I. 1.

I hope the Society may accept these works as a sign of my highest respect. As Sanscrit Literature is much cultivated in Germany, and many works published in India are not to be procured, even in London, I should be particularly obliged, if the Society would have the goodness, to cause about 10 or 15 copies of *all* works, formerly or lately published in India, to be forwarded to me, for immediate prompt payment, or instruct its agents to let the works be delivered to me at the prices fixed by the Society.

H. B. KÖNIG.

Bonn, 5th December, 1844.

With reference to Mr. König's request to be supplied with a number of copies of *all* the Sanscrit works published in Calcutta, the Secretary stated that Dr. Roer had prepared a list of Sanscrit works published in Calcutta, which he now presented, from which it appeared that 10 or 15 copies of each would amount to a very considerable sum. He further suggested that as a part of these works had been published by the School Book Society it was possible that body might be willing to send Mr. König their publications through the Society. He was hereupon authorized to refer to the School Book Society in the first instance, and for the details of this application to the Committee of Papers, when a scheme of returns could be finally made up and determined upon by the Society.

The Secretary in laying on the table the papers relative to Mr. Heatly's proposal for the reformation of the Statistical Committee, which had been circulated to the Committee of Papers, stated that the opinion expressed by that body was strongly in favour of the proposition, whereupon the following resolution was moved by Mr. Hufnagle, and seconded by Mr. Torrens.

“Resolved,—that the re-institution of Statistical Researches on a systematic plan by this Society appears a desirable object, and that a Committee be appointed for the purpose of considering and reporting on the specific measures through which this object may be obtained. The Committee to consist of Mr. Heatly and Mr. Alexander,”—which was carried unanimously.

Read a letter transmitted to the Secretary by order of Government from Capt. Nevile H. M. S. Serpent forwarding copies of the Logs of H. M. S. *Magicienne* in the hurricane of 1818 and 1819 at Port Louis, Mauritius.

The Sub-Secretary pointed out that these logs were printed both in the first and second edition of Col. Reid's work, 1838 and 1841.

Read the following letter from Government :—

No. 1289 of 1845.

FROM F. CURRIE, Esq. *Secretary to the Government of India,*

To the Secretary to the Asiatic Society of Fort William, the 2nd May, 1845.

FOREIGN DEPARTMENT.

SIR,—I am directed by the Governor General in Council, to transmit to you, for such notice as the Society may deem it to merit, the enclosed copy of a Report by Lieutenant Dalton of his visit to the hills on the banks of the Soobanshiri River.

F. CURRIE,

Fort William, the 2nd May, 1845.

Secretary to the Government of India.

Referred to the Editors of the Journal for publication.

The Secretary presented on the part of W. Seton Ker, Esq. C. S. a Note of the course of study of students in the Sanscrit language.

This interesting note was handed to the Editors of the Journals for early publication.

The Secretary reported that during his absence Dr. Sprenger, now Principal of the Delhi College, had addressed the Sub-Secretary as follows :—

“I have to ask you half a dozen other favors : I send this note to you through Messrs. Ostell and Co. who will pay you for the “*Geographie d' Abulfeda en Arabe*, 2 vols.” which is on sale at the Society for 5 rupees. You have once expressed that you would

sell duplicates of your library if so pray let me have "Asiri Bibliotheca, Arabo-Hispanica, in two volumes," of which you have two copies, you must not charge it too high.

I have written to Messrs. Ostell for De Sacy's *Grammaire Arabe*, and Hammer's *Geschichte der schonen Redekunste*, in Persian. If they should not be available at Calcutta, you would oblige me by lending me for a short time the copy of the Asiatic Society; I intend to have the *History of Persian Poetry* lithographed, and to compile an Arabic Grammar in Urdu, and want for a few days De Sacy's book.

and that officer having requested Dr. Roer to report on the application, received from him the following:—

TO H. PIDDINGTON, ESQ. *Sub-Secretary Asiatic Society.*

SIR,—With regard to Dr. Sprenger's application I have the honor to report, as follows:—

As Dr. Sprenger wants Hammer's "*Geschichte der schonen Redekunste in Persian*," and de Sacy's Arabic Grammar, for the purpose of publishing an Arabic Grammar for the use of the native students in this country, I would recommend to the Committee of Papers to assist him in his useful undertaking, and to allow him the use of those works for a limited period of two or three months. It would, however, not be advisable to accede to Dr. Sprenger's second request of selling him the duplicate copy of Asiri's "*Bibliotheca Hispano-Arabico*," a work very rare and valuable, and I take this opportunity of proposing to the Committee to establish it as a rule not to sell duplicates of valuable works, as it is of importance to keep always one copy in the library, while the other may be circulated among the members of the Society.

29th April, 1845.

E. ROER,

Librarian.

I quite agree in, and indeed suggested this arrangement.

H. PIDDINGTON,

Sub-Secretary.

which being circulated to the Committee of Papers for their sanction, Dr. Roer's recommendation was adopted, and the books have been forwarded to him by the steamer via Allahabad.

Read the following letter from the Royal Bavarian Academy of Munich:—

HENRY TORRENS, ESQ., *Vice-President and Secretary of the Asiatic Society of Bengal.*

SIR,—Having been favoured, by the intervention of Dr. William Griffith, with your kind declaration dated 23rd May 1844, that you would willingly order an exchange of publications between the Asiatic Society of Bengal and the Royal Academy of Sciences at Munich, I am directed to explain to you how much the Royal Bavarian Academy is gratified by such a literary intercourse. Supposing that the Asiatic Society of Bengal does not possess the series of *Memoirs* published in earlier times by the Bavarian Academy, a complete set of them shall be sent over to the care of Messrs. W. H. Allen and Company, Leadenhall Street, London. In return we take the liberty of announcing to you, what we are wanting in our library from your most precious publications.

1. Index to the 4th vol. of the *Mahabharat* complete.
2. *Ináya*, 2nd vol. 690 p. 3rd vol. 682 p. 4th vol. 937 p. in 4to.
3. *Jawáme-ool-Ilm-ul-Riázi*, 168 p.; with 17 plates 4to.

4. Anis-ul-Musharrahin, 541 p. 4to.
5. Sharaya-ool-Islam, 631 p. 4to.
6. Tibetan Dictionary, 373 p. 4to.
7. Vocabulary of Scinde language, by Capt. Eastwick.
8. Grammar and Vocabulary of the Baloochi and Punjabee languages. Leach.
9. Harriwansa, 563 p., royal 4to.

The other books are in our possession, and also partly the most interesting Journal of the Asiatic Society of Bengal, the completion of which by your kindness, I take the liberty to ask for. There is wanting of this most precious Journal, vols. I. II. III.; From the year 1839, are wanting the months of August, September, October and November; from 1841 is wanting No. CXIII., and from No. CXVIII. all is wanting published till to the present day. We should consider as a particular favour your friendly intervention for the completion of this work.

In the box containing the newer publications of our Academy, you will also find the Almanacks of the last years, which give a general catalogue of all our publications, and of which I beg you to select any more you may believe interesting for the purpose of the Asiatic Society. Also you will find there two little books of my own: *Systema Mat. Med. Veget. Brasiliensis*, and on the Constitution, Sicknesses and Physics of the American tribes, which I beseech you to present in my name to the Asiatic Society.

Regarding the Society's wish of possessing specimens of German geology, we have treated on this matter in the physical class of our Academy, and the members concerned in similar studies have been directed to get together a convenient collection for the Technic Geological Institute of your Society. But it is understood that such a collection cannot be ready immediately. After its completion it shall be committed into the hands of your agent at London. Every communication in any branch of natural history the Asiatic Society may think convenient for us, shall be highly acceptable. I beg you to send the Society's communications either by London, where your agent may take care of them, or to Hamburg directly, where Mr. G. T. E. Roeding is the Academy's agent.

Allow me, Sir, to present you the assurance of the high consideration with which I have the honour to be,

DR. MARTIUS,

Secretary of the Math. and Phys. Class of the Roy. Academy of Sciences.

Munich, 6th of January, 1845.

The Secretary was authorized to dispatch to the Royal Bavarian Academy the books required, and to express the gratification of the Society at the opening of an intercourse with this learned body.

Read the following note from Major Wroughton pointing out a misconception as to Colonel Stacy's Hebrew MSS. (Proceedings of January).

MY DEAR SIR,—I have just received a letter from my friend Colonel Stacy, in which he mentions that the Hebrew MS. sent by me, in his name, to the Asiatic Society's Museum, has by some misapprehension been considered as a donation. I have no recollection of the exact purport of my note, which accompanied the MS. but feel confident, if you

will kindly refer to it, that "I merely sent the MS. at Colonel Stacy's desire, to be lodged in the museum of the Asiatic Society."

Ballygunge, April 16th, 1845.

ROBERT WROUGHTON.

The Secretary stated that a note had been duly appended to the MSS. for which a tin case had been made, so as to preserve it as much as possible from all chance of injury.

Read a letter with Prospectus of his work forwarded by Dr. Falconer :*—

Prospectus preparing for publication, under the auspices of Her Majesty's Government, and of the Honourable the Court of Directors of the East India Company :

A work to be entitled,

FAUNA ANTIQUA SIVALENSIS,

Being the Fossil Zoology of the Sewalik Hills, in the north of India, by HUGH FALCONER, M.D., F.R.S., F.L.S., F.G.S., Member of the Asiatic Society of Bengal, and of the Royal Asiatic Society; of the Bengal Medical Service, and late superintendent of the H. E. I. C. Botanic Garden at Saharunpoor, and PROBY T. CAUTLEY, F.G.S., Captain in the Bengal Artillery, Member of the Asiatic Society of Bengal, &c.

The object of this publication is to make known, in a connected and complete series, the numerous fossil animals which have been discovered in the North of India, by the Authors and other inquirers, during the last twelve years; and to develop the bearings of these discoveries on the physical and geological history of India during a great part of the tertiary period.

The fossil Fauna of the Sewalik range of hills, skirting the southern base of the Himalayahs, has proved more abundant in genera and species than that of any other region yet explored. As a general expression of the leading features, it may be stated, that it appears to have been composed of representative forms of all ages, from the oldest of the tertiary period down to the modern, and of all the geographical divisions of the Old Continent, grouped together into one comprehensive Fauna in India. Of the forms contained in it may be enumerated, in the *Pachydermata*, several species of Mastodon and Elephant, the Hexaprotodon Hippopotami, Merycopotamus, Rhinoceros, Anoplotherium, Sus, and three species of Equus; in the *Ruminantia*, the colossal genus Sivatherium, peculiar to India, with species of Camelus, Camelopardalis, Bos, Cervus, and Antelope; in the *Carnivora*, species of most of the great types, together with several remarkable undescribed genera; in the *Rodentia*, several species; in the *Quadrupana*, several species; in the *Reptilia*, the Gigantic Tortoise (*Colossochelys*) with species of Emys and Trionyx, and several forms of Crocodile. To these may be added the fossil remains of Birds, Fishes, Crustacea, and Mollusca.

The materials in the possession of, or accessible to, the Authors, are singularly rich and abundant. They consist of vast collections made by themselves during the last twelve

* We re-print here the prospectus which will also re-appear for some time in an abridged form on the cover of the Journal as an advertisement, and we trust that the work will find in India the support it so richly merits.—Eds.

years along several hundred miles of the Sewalik range. Of these, one portion, which comprises the contents of upwards of two hundred chests, is now deposited in the British Museum, having been presented to the national collection by Captain Cautley, and will with the consent of the Trustees, supply the chief part of the descriptive details and illustrations of the Work. Other large collections in the India House will be resorted to when requisite; and in cases where their own materials may be less complete, and they will have access to specimens from the very extensive collections made by their friends and fellow-labourers, Colonel Colvin and Captains Baker and Durand, of the Bengal Engineers, whose published researches will be incorporated in the projected publication.

In order to embrace in it as far as may be possible a general Fossil Fauna of the Continent of India during the tertiary period, illustrations will be drawn from the Irawaddi fossil discoveries of Messrs. Clift and Crawford; from the researches of Dr. Spilsbury in the valley of the Nerbudda; and from those of Dr. Lush and Lieutenant Fuljames in the Gulf of Cambay, all of which localities have yielded fossil remains like those found in the Sewalik Hills. With the same object, all the available materials relating to the osseous remains of the elevated plains of Thibet, which are so importantly connected with the geological history of the Himalayahs, will be examined by the Authors, and described or figured when necessary.

On the completion of the palæontological details, a comprehensive account will follow, embracing the general results of the fossil inquiries, together with a geological description of the Sewalik Hills, to serve as an Introductory Chapter to the work. The Authors will have the aid of some of the most eminent living Naturalists in describing such departments as they may feel themselves but imperfectly qualified to deal with, such as the Fossil Fishes, Crustacea, and Mollusca.

The Authors have been induced to undertake the work by the belief, that the scientific reputation of this country and the credit of the Indian services are concerned in bringing to light researches embracing so many new facts, and bearing so importantly on the past physical history of the vast possessions of the British Empire in India. They are not insensible to the difficulty and extent of the subject, but they hope that they are in some measure prepared for it, by previous investigations, extending through several years.

In order to secure to science the full advantage of the Sewalik fossil researches, in a suitable form of publication, Her Majesty's Government and the Honourable Court of Directors of the East India Company have been pleased to accord such an amount of aid *in limine* as will ensure the successful progress of the work. The Publishers anticipate that a corresponding measure of support will be afforded by the scientific classes in England, by the British community in the three Presidencies of India, and by scientific men abroad.

Plan of Publication.—The Work will appear in about Twelve Parts, to be published at intervals of about four months, each containing from twelve to fifteen folio Plates, or an equivalent number of a larger size, where the nature of the subject may require it. The Plates to be accompanied by royal octavo letter-press. The price of each Part will be One Guinea in Europe, and Sixteen Rupees in India.

PART I.—Containing the Mastodons and Elephants will be published on the 1st of July, 1845.

Subscribers' Names will be received by the Publishers, Messrs. Smith, Elder and Co., 65, Cornhill, London; and by Messrs. Thacker and Co., Calcutta; Forbes and Co. Bombay; and Messrs. Frank and Co., Madras.

Read the following memorandum and letters :—

Memorandum.

The Secretary has to transmit two letters from the Baron Van Hoevell, and Baron de Carnbee (the latter gentleman being now in Calcutta) touching the establishment of a correspondence between our Society and that of Batavia.

I propose being authorised to send an acknowledgment of the books received, a series, as far as available, of the Journal, and the vols. of the Researches available for distribution, with a letter of thanks, and reciprocating wish to correspond.

If Messrs. Piddington and Blyth would draw each of them a note of objects in natural science desirable for our Museum from Java, with a request that we in our turn may be instructed from Batavia in like manner, these would materially add to the value of my letter.

I have seen the Baron de Carnbee, and have come to a most satisfactory understanding as to the footing on which the Societies would correspond.

H. TORRENS,

Vice-President and Secretary, Asiatic Society.

The Curators are requested to peruse the accompanying note and letters, and to put in a brief statement of the desiderata from Batavia in their several departments, which I can send down with my letter to the Society there. I have ascertained from Baron de Carnbee that English will be a convenient language of correspondence.

The Curators may state generally what duplicates or sets of duplicates they hold ready to transmit.

The Batavian Society are rich in Volcanic specimens.

H. TORRENS.

Vice-President and Secretary, Asiatic Society.

A Monsieur H. TORRENS, Secrétaire de la Société Asiatique à Calcutta, etc.

MON CHER MONSIEUR,—Je me rappelle avec plaisir notre entrevue d'hier. L'intérêt que vous manifestiez au développement et progrès de la Société Scientifique à Batavia, causera je vous en donne l'assurance, la plus grande satisfaction à tous les membres, et moi je me félicite de pouvoir leur communiquer l'heureux résultat de mes démarches. Sir Stamford Raffles, pendant plusieurs années président de notre Société, disait dans un de ses discours : "The objects of the Asiatic Society in Calcutta are so fully explained in the discourse of Sir William Jones, that it is unnecessary to enter into any explanation of them here. The researches of that Society are not confined immediately to Western India; they extend throughout the whole regions of Asia. The whole circle and the wide field of Asia are alike open to your observations, but it occurs to me, that the interests and objects of the Institution will be more advantageously promoted by its exertions being directed to what falls more immediately within your reach, &c."

J'espère que vous partagerez mon intime conviction qu'une correspondance régulière et continue, contribuera à servir efficacement le but de nos Sociétés réciproques.

J'ai eu l'honneur de vous faire voir quelques ouvrages récemment publiés à Batavia. Vous m'obligeriez d'accepter de ma part pour votre Société un exemplaire du : "Catalogus Plantarum in Horto Botanico Bogoejensi; auctore J. C. Haskarl, 1844," et un exemplaire du :—"Natuur und Geneeskundig Archief voor Neerlands Indie" (Archive pour les Sciences naturelles et médicales des Indes Néerlandaises 1^{re} Année 1844.)

Avant mon départ de Calcutta j'écrirai à Monsieur le Baron van Ijboevell (Président de notre Société) qui vous offrira d'autres publications entre autres le "Tydschrift voor

Neerlands Indie," qui existe déjà sept années, et contient plusieurs articles intéressants par rapport à la littérature Javanaise et autres branches scientifiques. A mon retour en Europe je pourrai traduire et arranger en Anglais quelques articles de ma composition traitant des Isles our de l'Archipel de la Sonde, etc. et je me trouverai heureux si après avoir été examinés, ils pourraient être placés dans le Journal de la Société Asiatique à Calcutta, Enfin, Monsieur, je vous prie d'accepter l'assurance de mon respect et considération et me signe

Votre tres humble Serviteur,

BE. G. MELVILL DE CARNBBE.

Calcutta, de 27 Mars, 1845.

A Monsieur le Secrétaire de la Société Asiatique à Calcutta.

MONSIEUR,—Monsieur la Baron Melvill de Carnbee, officier distingué de la Marine Hollandaise, chevalier de l'ordre Royal du lion Belgique et membre correspondant de la Société des arts et sciences de Batavia, se proposant de partir en peu de jours pour Calcutta, nous profitons avec empressement de cette occasion favorable pour adresser a votre honorable Société les deux exemplaires ci-joint des 18 et 19 volumes des Transactions de notre Société, qui renferment des documens précieux pour la littérature orientale

Nous vous prions Monsieur, de vouloir honorer Monsieur le Baron Melvill de votre bonté, et bienveillance et de faciliter, tant que possible, les recherches scientifiques qu'il se propose de faire dans l'Inde Britannique.

Recevez Monsieur, l'assurance de notre consideration distinguée.

La Direction de la Société des Arts et Sciences de Batavia,

VAN HOEVELL.

LEFECREHAVIE.

N. MYER.

Batavia, le 2 Janvier, 1845.

The Secretary stated that he had received from the curator of the Geological and Mineralogical Departments, his note of desiderata, and forthwith handed it to M. de Carnbee, and that he held now in his hand that of the Zoological curator which would be forwarded with his reply to the Society of Batavia.

Read the following letter from the Rev. Mr. Long :—

To H. TORRENS, Esq. *Secretary, Asiatic Society.*

DEAR SIR,—When on a visit to Kishnagar last January, I was favoured with a view of several pictures belonging to the Rajah of Kishnagar, three new portraits of various members of his family, and among the rest of Rajah Krishna Chandra Roy, of whom a most interesting memoir has been published in Bengali.

The drawings are kept in a damp place and are rapidly going to decay.

As one object of the Asiatic Society is to obtain rare drawings or portraits illustrative of the history of the country, it would be a desirable object to obtain the loan of those portraits in order to have copies taken.

The East India Company lie under deep obligations to Rajah Krishna Chandra Roy, as through his friendly disposition towards the English, and his influence over various Hindu rajas; the overthrow of the tyrant Suraj ad Doulah was facilitated.

Calcutta, April 17th, 1845.

JAMES LONG.

Mr. Long not being present the Secretary was desired to make some further inquiries.

Read the following letter from W. H. Hoff, Esq., the coins and human hand being on the table.

To H. TORRENS, Esq., *Secretary, Asiatic Society.*

SIR,—I have in my possession a few articles which I will send over if you think that they will be acceptable to the Asiatic Society.

The first is one of fifteen coins found in the interior and uncultivated parts of Singapore. On having a patch of land dug up, a gentleman discovered an earthen pot containing them. I have been unable to ascertain of what metal or mixture of metals the coin is composed; but I am inclined to think that zinc and silver have been employed in its manufacture. The obverse side bears the faint traces of some unknown characters, and on the reverse side there is a rude device of a lion or some other beast.

The next is a glass vessel containing a human hand kept in pepper. It belonged to a notorious footpad or robber who was long a terror to the inhabitants of the Nicobars, and had for a considerable time escaped punishment. He used to propel poisoned arrows through a *null* or tube about a yard in length merely with his breath! He was at last shot; but it was found impracticable to extricate the *null* from his death-grasp: it was consequently sawed off on both sides. The remaining portion is still in the clutch of the large and hairy hand.

24 March, 1845.

WM. H. HOFF.

The Secretary submitted, from the Sub-Secretary, a prospectus of a New Zodaical Map, to be edited by J. W. Woollgar, F. R. A. S., upon a new projection, and to a convenient scale; corresponding with the Maps of Schwink, and a little larger than those of Professor Argelander, containing about 1000 stars visible to the naked eye. The Sub-Secretary suggested that such a map (the price being also only 7s. 6d.) would be a useful addition to the Society's port-folios, and moreover that the Society might appropriately present one to the Prince of Mekhara. (See Proceedings October, 1844.) Two copies were ordered to be subscribed for.

The Sub-Secretary presented on the part of Captain F. M. Crisp of Moulmein, a grass petticoat and scarf worn by the women of the better classes at Teresa, one of the Car Nicobar Islands.

Read a letter from the Count Ange de St. Prioux, proposing that the Society should contribute either by funds or by the purchase of copies of a work entitled, "*Antiquités Mexicaines*" to the expenses of a joint "*Commission Scientifique Americaine*" formed at Paris for the further exploration of American Antiquities.

It was resolved ; that the Society regret its inability to co-operate, but that it feels it to be its duty in the first place to lend all its assistance to the efforts which may be made to investigate the yet unexplored fields of purely Indian Antiquities.

The Secretary read extracts from a private letter to his address from Lieutenant Fletcher Hayes, 62nd N. I., dated from Kya Ghurra, N. W. of Shikarpore, in which that officer who had just returned with the troops from the campaign in the Murree and Bhoogtee hills, mentions his having found the great utility of the "admirable vocabulary" of the Beloochee languages (by Major Leech), published in the Society's Journal, (Vol. VII. p. 538) and offers additions to it both in words and in phrases: this the Society would most thankfully accept and give early publication to.

Read the following memorandum, accompanying one of the New Zealand Jade-stone idols presented to the Society by Captain Fox.

Memorandum.

This stone was sent from New Zealand by a Mr. Lucette to me,—The stone is of value,—and particularly so in China. The Idol is often passed as a heirloom from generation to generation, as the supposed certain means of preventing any casualty in a family when contagious diseases predominate.

W. Fox.

31st March, 1845.

Read the following letter from Colonel Ouseley :—

MY DEAR SIR,—I promised to send you a copy of the original Sketch I did, and forwarded June 13, 1834, to Lord William Bentinck, of the Nerbudda. I have added to this now sent the great coal field of Benar (and other coal) I discovered ; and hope you will complete the sketch you gave in No. 151. (No. 67, 2nd Series).

From the nature of the coal procured at Benar I am quite sure, that the Bombay and Calcutta railways should pass *there*. The best iron and the best coal in India are produced there. The line should run along the foot of the Hills, where the Nulas are small, not near the Nerbudda when the nullas become wide chasms, and ravines of such width and depth as would greatly add to the expense of the road.

J. H. OUSELEY.

Chota Nagpur, 29th April, 1845.

P. S. The whole of the remarks on the left and right banks of the Nerbudda noticed in the printed sketch are verbatim from my own map, and the divisions on both sides of Estates, &c. as you could see if you ask Major Wroughton, Deputy Surveyor General, to allow you to look at the original.

J. H. O.

The map sent by Colonel Ouseley extending from Jubbulpore to Hoshungabad, and that compiled by the order of the Government N. W. P. and reduced for the Journal, Vol. XIII., from Hoshungabad

to the sea, were both on the table. The Editors of the Journal were directed to give all due publicity to Colonel Ouseley's labours by an additional lithograph in the journal, including the coal site of Benar and railroad sketch as added by him.

Read the following letter from Captain Fox, giving an account of the loss of the collection made by him for the Museum :—

H. TORRENS, Esq. *Secretary, Asiatic Society.*

SIR,—In the month of January last year, Mr. Blyth of the Museum, put on board the vessel I commanded a box, together with a quantity of Arsenical Soap, and other articles for the cure of such of the desiderata at New Holland and New Guinea, I might be enabled to procure. The boy and I succeeded in obtaining at New South Wales a tolerably good and large variety of specimens, which were packed up, but getting wet I was compelled to order their being thrown away in consequence of the offensive effluvia they emitted. A Satin and Regent Bird I cured myself, and being badly done, I took less care of them; they were suspended in my cabin, and remained good, and I believe a hawk the boy kept with his clothes. I did not visit Maulmein, having resigned command of the vessel. Among other things I lost a beautiful Eagle-hawk, Black-swan and a Wallahby. I had fondly hoped to have been the first to have brought a large quantity of specimens from New Guinea for our Calcutta Museum; but that gratification I was compelled to forego in consequence of annoyance in Sydney. Subsequently I brought the boy with me in the "Minerva," by which vessel we returned passengers, and owing to the crowded state of so small a vessel, (146 tons with 100 souls on board) the Captain directed the large box to be put under the stern boat, and one Sunday morning we all saw the box for a few seconds astern, it having fallen overboard and sunk. The boy behaved very well and is an excellent lad, and no blame whatever can attach itself to him. I am very sorry for so great a loss; but I trust the explanation will meet your approbation.

Your most obedient Servant,

W. Fox.

Calcutta, 16th April, 1845.

The Secretary stated that he held in his hand two MSS. books, containing notes and sketches made in the Hills, which had been kindly forwarded for publication in the Journal by Captain Marshall, but that the Editors had thought with reference to the time elapsed since the notes were made, and their somewhat private and domestic character, that they were not exactly suitable for the pages of the Journal.

Memorandum.—These note books were subsequently withdrawn by Captain Marshall.

Read the following letter from the Local Committee of Education at Agra :—

To H. TORRENS, Esq. *Secretary, Asiatic Society, Calcutta.*

SIR,—The Local Committee of Education at Agra being engaged in the formation

of a Museum of Economic Geology, in connexion with the Agra College, direct me to address you on the subject, and to state that—

2. They doubt not but that they may rely on the sympathy of the Asiatic Society in favor of an undertaking which has for its ultimate aim the ascertainment and development of the mineral resources of this country, and primarily, of the North Western Provinces, as yet so imperfectly determined.

3. That should your Society be possessed of any disposable Geological Specimens of the economic kind, the Committee would feel greatly obliged by being favored with them.

4. As this work has been but just commenced, the Committee are at present unable to offer to your Society any thing in return; but they trust they may by and by be in a position to reciprocate the favor for which they now ask.

I have the honor to be, Sir, Your most obdt. Servant,

J. MIDDLETON,

Secretary.

Agra College, 1st May, 1845.

The Curator Museum Economic Geology stated that a few specimens would be available from that Department, and is preparing them for forwarding was accordingly sanctioned.

REPORT OF THE CURATOR GEOLOGICAL AND MINERALOGICAL DEPARTMENT AND
MUSEUM OF ECONOMIC GEOLOGY FOR THE MONTHS OF MARCH AND APRIL.

Geological and Mineralogical.

We have received from Government a report addressed by Captain Tremenheere B. E. of Maulmein to the Military Board, on the prices of tin ore, with specimens of tin ore from a new locality called Henzai to the north of Maulmein, and also of some supposed copper ores, or indications of copper, from the Maulmein hills in that vicinity, but on examination they prove to be only the well-known pavonine Antimonial coatings, as nothing but Antimony and Iron can be traced in them; though so much resembling copper as to be taken for it even by experienced persons.

This has been duly reported upon to Government, and Captain Tremenheere's attention directed to the scite of Batto Kayen Karian near Maulmein, from whence we have a true copper ore in the Museum; supposed to have been sent by Lieutenant Foley to Mr. James Prinsep.

Captain Phayre, Assistant Commissioner, Arracan has sent us from Sandoway a series of specimens carefully numbered and catalogued, with the following letter:—

"MY DEAR MR. PIDDINGTON,—You may remember you asked me to procure a series of the rocks occurring from the foot to the top of the *Aeng* pass. I have not been able to do this, but having gone in December to the top of the Yoma range of mountains, direct east of this town, I collected a complete series of the rocks and have now the pleasure to send them, together with a map, and a note on the route, &c.

I hope my remarks may be intelligible, though I have great doubts thereon, however, I have done my best to meet your wishes. I looked out particularly for the minerals you mentioned (and of which you sent a box of specimens, herewith returned with many thanks) but was not fortunate enough to meet with any. I could not delay at the spot, or I should have remained a day or two longer.

Sandoway, Feb. 25th, 1845.

A. P. PHAYRE.

P. S. In your letter dated the 4th August, 1844, you allude to a paper of *queries* regarding the volcanic islands on the coast ; this paper I never received, and I fear I shall scarcely be able to proceed to the islands this season ; but if you will kindly transmit the queries, they may induce me to go, and show me also what you require."

Captain J. Abbott, B. A. has obliged us with a paper on Kunkur, with specimens containing his views on its formation, which will doubtless be printed in the Journal, as offering, especially, views formed on the spot and in the alluvial soil : to which I refer more particularly, as Captain Newbold has lately favored us with his views principally from the Kunkur fields in the great trap formation of Central India.

Through Captain Baker, B. E. we have received a letter from Lieutenant Blagrave which should have accompanied his boxes of Scinde fossils and fish. It is as follows :—

To the Secretary to the Asiatic Society, Calcutta.

SIR,—I have the pleasure of sending you a few fossil shells and zoophytes found in the neighbourhood of Roree, Tatta, and Kurachee, also a few recent sea shells found in the tops of the sand hills in the vicinity of the Ullah Bund, and some fish from the Sindra lake. As I hear that the Society are publishing Sir A. Burnes' illustrations of the fishes of Scinde, some of these may be new, as I believe he got none of the fishes of the Sindra lake, and thought that none existed in it on account of the extreme saltiness of its waters ; but when I visited it, in July last, the banks were strewn with fish and water insects evidently thrown upon the shore by some recent storm, along with several small dead birds and thousands of locusts, which had evidently perished in trying to cross the lake. There were several other kinds of fish both large and small, which I had not the means of carrying away with me ; many quite new, at least to me ; however, if I re-visit that neighbourhood, I will make a collection for the Society's Museum. I had intended sending a collection of recent shells from the beach at Clifton, (Kurachee) along with the fossil ones, for comparison, but I have had no time to make the selections or even to look over the fossils, among which there may be a lot of trash ; but should I be here another year, should the Society wish it, I will endeavour to make a good collection of both for them. I shall be employed in surveying the hills on the western boundary during the cold weather, and if I find anything worth sending will do so. Can you give me any hints for analyzing soils, as I think it would be to the advantage of Government were the different kinds of soils in Scinde known, and oblige,

Yours truly,

1st October, 1844, Camp Kurachee.

T. C. BLAGRAVE.

From Mr. Conductor Dawe we are apprised of the dispatch of five chests of fossils selected by him, under Captain Baker's directions, from the remains of the Dadoopoor Museum, which are on their way down to us.

We have to announce also two more papers of great importance from Capt. Newbold, being "Notes on the Geology of the Southern Mahratta Country," and "Geological Notes across the Peninsula," which will no doubt find an early place in our Journal.

MUSEUM ECONOMIC GEOLOGY.

We have received from Captain Sherwill a box of stones for trial as lithographic stones from the table-land of Rhotasghur, but I fear most of them will be found too siliceous or too thin. Many indeed are evidently defective, but some promise well, and I shall take steps to have them fairly tried.

Major Williams of Kyook Phyoo, who some time ago sent us a minute specimen of a stone called *Samy stone* in the West of India, as having been sold to his brother by a

Cavalry soldier, as highly valuable for the purpose of polishing the bits of bridles, (See Proceedings of January, 1845,) has now sent us a larger specimen, which proves it to be the common Agalmatolite only, and not as I had judged by the examination of the previous pepper-corn specimen, the fine variety called Pagodite. Major Williams says :—

MY DEAR SIR,—My brother has sent me a larger piece of the “Samy Stone,” and requests I would send it to you, and I shall feel extremely obliged if you could inform me where I can obtain a quantity of it. Dr. Rose has kindly consented to convey it to you. My brother mentions also his having sent your former letter to me on this subject to Mr. Murchison, the Geologist ; the stone appears to be in request at home, more so perhaps than in India, where its use is not known apparently,

Kedgerree, 25th February, 1845.

D. WILLIAMS.

Whence I presume that it has been found, as I supposed, of use at home, or at least that, as I have remarked, it was thought well-worth attention when a quantity could be procured. I have written to Captain Ouseley requesting him to send us a good cooley load of his Agalmatolite from Chota Nagpore, with which this is identical.

We have received from the Dundee Watt Institution, through Dr. Wise, a box of Mineralogical and Geological specimens, some of which are handsome and of interest, but many, indeed most of them, are unfortunately without labels, which, for the Geological specimens particularly, is a very great drawback on their value.

Mr. W. St. Quintin, C. S. has referred to us from Darjeeling specimens of a quartz pebble and of fibrous hornblende rock, supposed to contain Gold, but the appearance is due merely to common pyrites. This might nevertheless be auriferous, but is in too small quantity to be detected in such very minute specimens ; the rock might contain but one-tenth part of pyrites and the pyrites but one hundredth part of gold and yet be worth working on the large scale.

For all the above presentations and communications the best thanks of the Society were accorded.

Proceedings of the Asiatic Society of Bengal, JUNE, 1845.

The stated monthly meeting of the Asiatic Society was held at the Rooms, at $\frac{1}{2}$ past 8 p. m. on Tuesday the 17th June, Charles Huffnagle, Esq. senior member of the Committee of Papers, in the chair.

The proceedings of the May meeting were read, and with a few additions and corrections confirmed.

Read the following list of Books presented, purchased and exchanged during the last month :

Books received for the Meeting of Tuesday, the 17th June, 1845.

Presented.

The Meteorological Register, for April, 1845.

The Oriental Christian Spectator, Nos. 5 and 6, for May and June, 1845.—By the Editor.

The Calcutta Christian Observer, for June, 1845.—By the Editors.

The London, Edinburgh, and Dublin Philosophical Magazine, and Journal of Science, for January, 1845.—By the Editor.

The Edinburgh New Philosophical Journal, October, 1844, to January, 1845.—By the Editor.

Proceedings of the Academy of Natural Sciences of Philadelphia, for March and April, 1844.—By the Academy.

Ditto, ditto, ditto, for May and June, 1844.—By the Academy.

An Address to the Students of the Benares College.—By J. Muir, Esq.

Brief Lectures on Mental Philosophy, delivered in Sanskrit.—By J. Muir, Esq.

Annales des Sciences Physiques, et Naturelles D' Agriculture et D' Industrie.—By the Royal Agricultural Society of Lyons, Vol. 6.

Archæologia or Miscellaneous Tracts relating to Antiquity, Vol. XXX.—By the Archæological Society.

Index to Archæologia, from Vol. XVI. to XXX.—By the Archæological Society.

Magnetical and Meteorological Observations.—By the Honorable the Court of Directors,

Prasastiprakāsika.—By the author, Krishnolall Deb.

Supplement to the Glossary of Indian Terms.—By H. M. Elliott, Esq. Civil Service, from the Government N. W. P.

Exchanged.

Calcutta Journal of Natural History.

Journal of the Agricultural and Horticultural Society of India.

Journal Asiatique, Vol. VI.

The Athenæum, for March 29th, 1845, and 5th, 12th, and 19th April, 1845.

Purchased.

Mantell's Medals of Creation, Vols. 1 and 2.

The History of Etruria, Part II.

The History of the Reign of Tippoo Sultan, translated from an Original Persian MSS.

The Classical Museum, No. VII.

The Annals and Magazine of Natural History, April, 1845.

Journal Des Savans, November and December, 1844.

Illustrations of Indian Ornithology.—By T. C. Jerdon, Esq.

The Asiatic Journal and Monthly Register, for the years 1841, 42, 43, 44, and the first No. of 1845.

Map of the Kuree Vesetra.—By Lichashahaba.

Read the following letter accompanying the very valuable and curious work to which it refers :—

No. 413.

FROM J. THORNTON, Esq. *Secretary to Government N. W. P.*

To the Secretary, Asiatic Society Calcutta, dated Agra, 21st April, 1845.

GENL. DEPT. N. W. P.

SIR,—I am directed to transmit to you, for the Society's use, a printed copy of Supplementary Glossary of Indian Terms prepared by Mr. H. M. Elliot, Secretary to the Sudder Board of Revenue N. W. P.

Agra, 21st April, 1845.

J. THORNTON,
Secretary to Government N. W. P.

Read the following letter accompanying the paper to which it refers which was handed to the Editors of the Journal for publication :—

(No. 1353, of 1845.)

FROM F. CURRIE, Esq. *Secretary to the Government of India.*

To the Secretary to the Asiatic Society, dated Fort William, the 9th May, 1845.

FOREIGN DEPT.

SIR,—In continuation of my letter to your address, No. 1289, dated the 2nd instant, I am directed by the Governor General in Council to transmit, for such notice as the Society may deem it to merit, the accompanying copy of a report by Lieutenant Dalton, of the traffic carried on with the tribes of Meris and Abors, and some information of a tribe of hill people called Ankas or Jamaee.

Fort William, the 9th May, 1845.

F. CURRIE,
Secretary to the Government of India.

Read the following letters relative to a Gold Medal of H. I. M. the Emperor of Russia, presented by him to the Society which was on the table :

TO THE RIGHT HON'BLE SIR HENRY HARDINGE, G. C. B.

&c. &c. &c.

SIR,—I have the honor to transmit to you, with a request that you will have the goodness to direct them to be safely delivered, a letter and a box containing a gold medal which have been addressed to the Asiatic Society of Bengal, by command of the Emperor of Russia.

have the honor to be, Sir,

Your most obdt. Servant,

(Signed,) RAPON.

India House, March 29, 1845.

A la Société Asiatique du Bengale.

J'ai eu l'honneur de porter à la connaissance de Sa Majesté Impériale l'hommage fait par la Société Asiatique du Bengale de ses principales publications concernant les littératures Arabe, Sanscrite et Tibétaine.

L'Empereur mon auguste Maître, ayant daigné agréer avec bonté l'offre de l'association savante, m'a ordonné de lui transmettre l'expression de sa haute bienveillance ; en témoignage de laquelle Sa Majesté a daigné conférer à la Société Asiatique du Bengale une grande médaille en or à l'effigie de Sa Majesté.

Je viens de recevoir par l'entremise de la maison de commerce du Baron Stieglitz, une caisse contenant un seul exemplaire des publications sus mentionnées et je m'empresse de m'acquitter de l'ordre Suprême, en transmettant ci-joint à la Société Asiatique du Bengale, la médaille en or, que Sa Majesté a bien voulu lui accorder.

En joignant à cette office un exemplaire des principaux ouvrages, portés sur la liste ci-après, du domaine de la littérature orientale, qui ont paru en Russie, je me félicite d'avoir été l'organe des rapports littéraires entre la Société Asiatique du Bengale et l'Empire de Russie.

(Signed,)

OUVAROFF,

Le Ministre de l'instruction publique.

St. Petersbourg, ce 25 October, 1844, 7th Novembre.

Liste des ouvrages destinés à la Société Asiatique du Bengale.

1. Der Weise und der Thor. Aus dem Tibetischen übersetzt und mit dem Originaltexte herausgegeben von T. J. Schmidt, St. Petersburg, 1843, 1 vol.
2. Die Thaten Bogda Gasser Chan's, des Vertilgers der Wurzel der zehn Übel in den zehn Gegenden. Aus dem Mongolischen übersetzt von T. J. Schmidt, St. Petersburg, 1839, 1 vol.
3. Idem. Traduction russe.
4. Tibetisches Deutsches Wörterbuch von T. J. Schmidt, St. Petersburg, 1841, 1 vol.
5. Dictionnaire Mongol Allemand-russe, publié par T. J. Schmidt, St. Petersburg, 1835, 1 vol.

6. Grammatik der mongolischen Sprache, verfasst von T. J. Schmidt, St. Petersburg, 1831, 1 vol.
7. Grammatik der tibetischen Sprache, verfasst von T. J. Schmidt, St. Petersburg, 1839, 1 vol.
8. Ch. M. Fraehnii Recensio numerum Muhamedanorum Academia Imp. scient. Petropolitana; inter prima Academia Imp. sæcularia edita. Petropoli, 1826, 1 vol.
9. Die Münzen der Chane tom Ulus Dschutschi's order von der goldenen Horde, von Ch. M. von Fraehn, St. Petersburg, 1832, 1 vol.
10. Ibn Feszlan's und anderer Araber Berichte über die Russen älterer Zeit, von C. M. Fraehn, St. Petersburg, 1823, 1 vol.
11. Monographie des monnaies armeniennes, par M. Brosset. St. Petersburg, 1839, 1 vol.
12. Description géographique de la Géorgie, par le Tsarevitch Wakhought, publiée d'après l'original autographe par M. Brosset, St. Petersburg, 1842, 1 vol.
13. Catalogue de la bibliothèque d'Edchmiadzin, publiée par M. Brosset, St. Petersburg, 1840, 1 vol.
14. Sammlungen historischer Nachrichten über die Mongolischen Völkerschaften durch. P. S. Pallas, St. Petersburg, 1776, 2 vols.
15. Dictionnaire géorgien russe français, composé par David Tchoubinof, St. Petersburg, 1840, 1 vol.
16. Archiv für Asiatische Litteratur, Geschichte und Sprachkunde, verfasst von Julius von Klaproth, St. Petersburg, 1810, 1 vol.
17. Chrestomathie mongole, publié par T. Kovaleffsky, Casan, 1836, 2 vols.
18. Chrestomathie mongole, publié par A. Popoff, Casan, 1836, 1 vol.
19. Chrestomathie persane, publié par A. Boldyreff, Moscou, 1833, 2 vols.
20. Grammaire de la langue turco-tatare, publié par le Prof. Kasim. Bek. Casan, 1839, 1 vol.
21. Dictionnaire arménien russe, publié par A. Houdobacheff, Moscou, 1838, 2 vols.
22. Asseb. O. Seyar on sept planètes; Histoire des Chans de la Crimée; Ouvrage de Seid Muhammed Risa, Casan, 1832, 1 vol.
23. Recueil de maximes, prières, fables, etc, traduites en langue mongole, Casan, 1841, 1 vol.
24. Arithmétique en langue mongole, publiée par A. Popoff, Casan, 1837, 1 vol.
25. Grammaire chinoise, composée par le père Hyacynthe, St. Petersburg, 1838, 1 vol.
26. Ghata Karparam, par P. Petroff, Casan, 1844.
27. San. Tsi. Tsin, traduit du Chinois par le père Hyacynthe, St. Petersburg, 1829, 1 vol.

(Signed,) K. KOMOSKEY,

Directeur de la Chamberie du Ministre.

The Secretary was requested to convey to the Russian Minister of Public Instruction, and to request him to express to His Imperial Master, the expression of the Society's most respectful thanks for the high honour conferred on it; as also for the very valuable additions to the library comprised in H. I. M. donation.

Read the following letter from Major Leech, C. B. Acting Secretary to the Governor General, N. W. P.

H. TORRENS, ESQ. *V. P. and Secretary, Asiatic Society.*

MY DEAR SIR,—With reference to my letter to your address of the 14th of February last, and to your reply of the 2d of last March, erroneously addressed to Mr. Cust, I have now the pleasure to transmit to you the commencement (10 times as much will follow) of the manuscript Sanscrit to accompany the Maps of the Kuruk Ghetr which I dispatched by banghy dawk on the 26th ultimo.

I am much flattered to find that my undertaking is highly interesting to the Society, and was also so last cold weather by the great interest the Lieutenant-Governor of Agra did me the honor to express in the same.

Wherever I have been stationed I have felt that I owed it as a duty to the literary public, as well as to Government, to enquire as much as my leisure moments would permit, into the language, religious customs, and ancient history of the people I have been placed among.

Judging from the interest felt in my undertaking in this neighbourhood where the people are familiarized with the scene, I am led to believe that there is not a Native (Hindoo) Court or seat of learning, or possessors of a copy of the Mahabharut in India, at which and to whom a copy of the maps at least would not be a most valuable and highly prized acquisition, while to your learned correspondents in Europe you flatter me by saying it would not be wholly unacceptable.

I anticipate its being said by a few, and I hope a very few, that the publication of such documents is a prostitution of the press, an offering to Hindoo Idols. But by far the greater numbers will regard it in its true light, as an illustration of the Ancient Geography of one of the most classic spots in India, tending to create or increase a taste for printing and lithographing among the Natives. And perchance, by making the district of Uglhul the more frequent resort of men of rank, tend to a prosperity to which it has for so many years before lapsing to the British Government been a stranger.

I am indebted to my friend Captain Abbott, who succeeded me in charge of the district of Uglhul, for the loan of surveying instruments, and of his valuable map of the district, and to the Rajahs of Pateala and Jheend, and the Surdurnea of Thanetur for their ready permission to survey such part of their territories as came within the Kuruk Ghetr.

You will perceive in this instance, as in others that have come under the notice of the Society (Journals of Natives employed by me in travelling across the Indus published by them) that I have not, as is too often the fashion, robbed the real though humble labourer of his hire, but have made the Pundit of the small Ambalah School, Jwaharlal, enter his name as the compiler of the present manuscript. I have made him again enter the name of Dander, from whose Mahatma he has condensed most of his Urdu.

Labour I have had none. Expense I have incurred little, perhaps not more than 200 rupees. I was alone fortunate in the undertaking suggesting itself to me.

I have in preparation a Persian map and a Persian Mahatma, comprising the local legends, undertaken at the request of most of the chiefs with whom I am acquainted in these parts.

I cannot here refrain from calling attention to a little mistake or two made by the immaculate authority as to the history and country of the Seikhs, who writes in the Calcutta

Review, page 156, (the Seikhs and their country.) "The word Kora-Chetre denotes the field of Kora, the opponent of the Pandus."

"With Thanesur nearly as the centre of the country around in a radius of twenty miles is holy ground, and every ghat on the Saraswati, and nearly every tank within that area is a Teeruth, a place of pilgrimage."

The words "opponent and centre" are of course the *trifling* mistakes I allude to.

Should there be a difficulty in lithographing the Teeruths in red letters it will not signify their being black with the rest.

By this day's banghy dawk I have despatched a drawing of a Prathanea found at Bhyn Jahsh some years back, which ought to be reduced to quarter its present size to bear binding in the account of that Teeruth.

I have to apologize for the execution of the map. Having had no time myself to devote to it. I have been obliged to entrust it to a very indifferent Native draughtsman, but still the best procurable, of its correctness notwithstanding I am well satisfied.

The border of the map which is very incorrectly drawn being taken from the Prathanea is suitably antique.

I shall be happy to publish the map and account myself on ascertaining the probable expense through your kind assistance, should the Society, from the fact of their not being in English, consider them unadapted to the Journal or the Researches, or I shall be happy to see them put into any other shape or language under the auspices of the Society by any one having the necessary leisure which I have not.

Your's very truly,

(Signed,)

Ambalah, 3d June, 1845.

Read the following letter from the Archæological Society:—

The Secretary of the Asiatic Society, Calcutta.

SIR,—I am directed by the President and Council of the Society of Antiquaries of London, to forward to you the following publications, for the use of the Asiatic Society, Calcutta, viz.

Archæologia, Vol. XXX.

Index to ditto, from Vol. XVI. to Vol. XXX.

Somerset Place, 29th Nov. 1844.

NICH. CARLISLE,

Secretary.

Read the following letter:—

To H. TORRENS, Esq. Vice President and Secretary, Asiatic Society.

SIR,—I have the pleasure to forward the accompanying (7) seven volumes, being the only works in Sanskrit in the Calcutta School Book Society's Depository. I regret that our stores should furnish so meagre a supply, but works in the Sanskrit language are so little called for that the Society have not considered it worth while to enlarge their selection at present.

The amount of the books is 8 Rs. 9 an. ; which you can either pay now, or allow to stand over to some future time, as most convenient to yourself.

C. S. B. S. Library, May 23, 1845,

J. SYKES,

Sec. C. S. B. S.

Resolved that, pending Messrs. König's final orders the bills be allowed to stand over, as kindly offered by the School Book Society.

Read a letter to the Sub-Secretary from the Rev. J. J. Moore, Secy. Agra School Society, acknowledging the receipt of the copy of the *Rekha Ganita* made here for him* (See proceedings April, 1844) and inclosing a draft for the amount :—

Read a memorandum from the Sub-Secretary noticing that Dr. Campbell, of Darjeeling, had obliged the Society with 44 old numbers of the *Journal*.

Read the following note relative to the model of the Gun “Zubberjung :”—

MY DEAR SIR,—Some time ago a model of the celebrated “Zubberjung” Gun, which was burst on the return of the army from Afghanistan, was sent to the museum of the Asiatic Society by mistake. It should have been forwarded to Mr. Curmin of the Mint, and since I have been apprized of the error, will you kindly do me the favor to make it over to the bearer, and I will agreeably to Colonel Stacy's instructions, send it on to Mr. Curmin.

Believe me, yours sincerely,

ROBT. WROUGHTON.

Ballygunge, May 21st, 1845.

And the Secretary stated that in returning the model he has requested Major Wroughton to oblige the Society with a cast also, on paying for the expense, which he had kindly promised to procure for it.

Read the following letter from Captain Russell, H. C. Steamer *Ganges* relative to the presentation to which it alludes :—

HENRY TORRENS, Esq., *Secretary to the Asiatic Society.*

DEAR SIR,—On my last trip in the H. C. Steamer *Ganges* to the Nicobar Islands, I found a curious custom existing amongst the Natives of preserving the bones of their chiefs or principal persons. At Lalone, a village in the N. E. side of the island of Theresa, at the place where the brig or schooner *Mary* was cut off in either May, June, or July, 1844, Captain Ventura and his crew were all murdered, and the vessel burnt, part of her rigging and stores were found in the houses, the natives having fled to the jungles. Close to this village under a tree were several, say 15 or 16, of the bones of these persons dressed up as you will find by the specimen, which Captain Patterson has the kindness to take up to you from me, which I request you will present to the Asiatic Society.

On enquiry I find that from three to four months after being buried, the bones are carefully taken up, and dried, afterwards at their feasts carried about to every house by the young girls, and then placed under a tree with cocoanuts, yams, &c. laid near them. Trusting this may be deemed acceptable to your Society.

Moulmain, 14th May, 1845.

J. RUSSELL,

Commander H. C. Steamer “Ganges.”

* But we have not been able to obtain one with the diagrams. We should be obliged to any friend who could indicate to us where a copy exists with the diagrams.—EDS.

Read the following letter in Persian accompanying the work to which it alludes :—

غریب پور عالمیان و قدردان عالمان ولی النعمت دام اقباله

میدوساند

بعد عرض

که روزی بتقریبی فیما بین فدوی و مولوی مظہر علی صاحب مذاکرہ صاحبان عالیشان امثال اگستس بروک صاحب و غیرہم کہ اختیار زمان و محض مجبور و مخلوق بنفع رسانی و قدردانی و رتبہ شناسی ہر اشخاص علی حسب حال بودند بمیان آمدہ برفتدان همچنان رئیسان و حکام ذی شان تاسف و قلق ہا بودہ اندرینصورت نیاز کیش بذکر اوصاف جزئیہ و اخلاق جمیلہ و صفات کریمہ آن ولی النعمت کہ او تعالیٰ و تقدس شانہ عطا فرمودہ است پرداختہ تلخی قلق ایشان را بشیرینی سرور موفور و حبور نامحصور مبدل ساخت و محرک تصنیف این رسالہ بنام نامی جذاب خدا یگانی گشت و از جذاب احدیت مستدعی بودم کہ عنداللزمت باسعادت مولوی صاحب مسبوق بالمدح بوفور عنایات و اخلاق آنوالا جاہی چنانکہ بیان کردہ ام بہرہ مند شوند تا بروقع خلاف بیان خجالت نہرم الحمد للہ ثم الحمد للہ کہ ایشان از قدردانی و مردم شناسی خدا یگانی خیلی مسرور و مشغوف گشتند حتی کہ اگر بالفرض درین شہر بابی علاقگی نامدت دراز طرح اقامت اندازند و گاہ گاہ بشرف ملازمت کیمیا خاصیت آن والا جہی بہرہ اندوز شوند اصلا و ہر گز لب را بشکایت زمانہ آشنا نسازند و چون نیاز مند بجا آوری امور متعلقہ خود را گو کسی داند یا نداند دہندہ روزی میداند بر خود من قبیل واجبات می کرد لہذا بعد عرصہ دراز اتفاق تقبیل عتبہ سنہ میشود فاما در صورت ارادہ استحصا ل این سعادت یعنی ملازمت جذباعالی کار روز آئندہ از پیشتر بمقداری کہ مساوی کار ہر روزہ باشد انجام نمودہ برای سلام آن ولی النعمت حاضر میشوم باقی مراتب عرض کردنی محمول حامل این عریضہ است زیادہ

حد ادب

یکم ماہ اپریل سنہ ۱۸۴۵ ع

ع ————— رضی

فدوی عبدالوہاب مژومل بندگان عالی

The Secretary was desired to write to the author, expressing in the name of the Society its high approbation of the work, and especially as regards the introduction of the Copernican system into it.

REPORT OF THE CURATOR MUSEUM OF ECONOMIC GEOLOGY, AND GEOLOGICAL AND MINERALOGICAL DEPARTMENTS, FOR THE MONTH OF MAY.

Geological and Mineralogical.

Lieutenant Sherwill, whose beautiful Geological map and collection of specimens of Zillah Behar was brought before the Society in January has at my request, added to it.—I may say he has doubled its value—by giving us first a note of the heights of forty-two points measured or estimated, and then a general geological memorandum of the district. He has further, and this is not mere ornament, added to the map a set of vignettes most capably executed, and admirably chosen to convey a faithful idea of that district.

From the whole we shall, I doubt not, be able to give as good a preliminary geological idea of the district as can be desired, or indeed expected, for nothing short of a geological survey can of course produce a correct one.

We have also received Captain Phayre's sketch map to accompany the series of specimens from Sandoway to the top of the Yoma mountains exhibited at the last meeting. The map had been left on board the H. C. S. Amherst.

Lieutenant Strover has forwarded to us, at the request of Captain Abbott, some specimens illustrative of his paper on the occurrence of granite in the bed of the Nerbudda. Lieutenant Strover says,

MY DEAR SIR,—In a letter I received from Captain Abbott, he mentions that some specimens of trap blended with granite found in the bed of the Nerbudda here would be acceptable to the Society. I therefore, without delay, despatch them by Banghy Dawk franked by the political officer here; I have sent five different packets, viz., 1st the trap, 2nd granite, 3rd the granite and trap where the former preponderates, 4th where the latter is in excess, 5th indistinct blending of the two. Should the society require other specimens or layer, I shall be happy to meet with their wishes.

Museum of Economic Geology.

We have received from Captain Ousely a good supply of the Agalmatolite which as mentioned in my last report, we had recognised Major Williams' *Samy stone* to be; and some of it really proves to be a very fine variety, almost approaching the Pagodite.

A box of 8 or 10 lbs. weight has been sent, in the name of the Society, to Major Williams' brother, with a request that he would inform us of the success of it as a polishing material, for which, and as an anti-attrition one also, it seems admirably adapted.

I shall also endeavour to have trials made of it soon; the different varieties we have received, I have distinguished as follows in our collection and to Mr. Williams:

A. Large block, light greenish-white fracture, talcky in some parts; the weathered surface yellowish.

B. Sawn piece; whitish, slaty grey where cut; on the fractured surface green, grain finer and even.

C. Thinly laminated, and contorted. Impure between the laminations.

D. Thick laminated and contorted, perhaps a harder kind.

Major General Cullen has forwarded to us from Trevandrum two specimens of Graphite. This graphite is of the soft, loose scaly kind which would evidently not serve for pencils, and for inferior uses it is probably too cheap at home to render it worth shipping. Nevertheless a few maunds might be tried since its collection and package would be made at a trifling expense.

General Cullen says—for though not writing for publication I cannot do better than borrow his words:

Cochin, 3rd March, 1845.

“ I send you by a vessel bound for Calcutta some specimens of what I suppose to be Graphite which I lately discovered near Trevandrum in Travancore. You may perhaps have observed in a late No. (30) of the Madras Journal of Science a slight notice of the discovery by me of this mineral in Tinnevely as well as Travancore? At first the indications of it were trifling, consisting merely of small scales or sometimes of thin plates about the size of a dollar disseminated in the Limestone or Gneiss of Tinnevely or the Gneiss or Laterite of Travancore. Subsequent researches have proved to me that it is not only very generally (widely) distributed, but that it is not improbable it may be found in such abundance and purity as to render it an article of commerce.

I have procured some specimens of very fine sorts, in lumps about the size of a small egg, from pits in a Kunkur deposit at Tinnevely, but I have not yet been able to visit and examine the spot carefully. The lumps, however, seem to consist of scales or lamina rather closely aggregated, but not so much so as to admit of leads being cut out of them fit for pencils, it is also exceedingly flexible or soft.

Perhaps, however, at a great depth or incumbent pressure its solidity may be greater.

Small scales or plates of graphite are also exceedingly common in Travancore, particularly south of Trevandrum, but I have found traces of it as far north even as Cochin.

The variety of graphite which I have sent you by sea was discovered in my search for finer specimens of the laminar kind. I learnt that the potters of Trevandrum occasionally, at the great festivals, blackened their earthen vessels with a mineral which was supposed to be plumbago.

I visited the spot, which was 5 or 6 miles from Trevandrum, on the slope of a gneiss hill, the lower portions of which were overlaid with laterite; or rather the gneiss rock was there decomposed into laterite, to a certain depth from the surface; small lumps of laterite containing the plumbago were lying about on the surface, there was no regular workings, but I opened the soil or laterite in the bed of a water course for a distance of about 40 or 50 feet, and found a regular stratum or vein of the mineral more or less rich; imbedded and lying parallel to the strata of laterite as the specimens now sent. It appeared to become rich as we went deeper. I brought away some hundred pounds of the mixed ore or laterite. It has not yet been turned to any account.

Its fibrous appearance only excepted, or rather its granular texture and its application to pottery, made me suppose at first that it might be an ore of antimony, nor does it soil so strongly as the laminar varieties. The fibrous varieties are very like specimens which I have of the Ceylon graphite; the geological relation to the deposit in Ceylon will be interesting.

You are aware probably of the singular carbonaceous deposits in the south of Travancore, have these a connection with the occurrence of the Graphite? probably not. These carbonaceous or lignite beds are chiefly immediately on the coast between Quilon and Trevandrum, but they are found also 30 miles south of Trevandrum, and also in Malabar near Calicut, as noticed by Captain Newbold."

Col. Ousely has forwarded through Mr. Secretary Halliday a fine set of specimens of the Galena of Hisato, which will be I hope more fully reported on at our next meeting.